

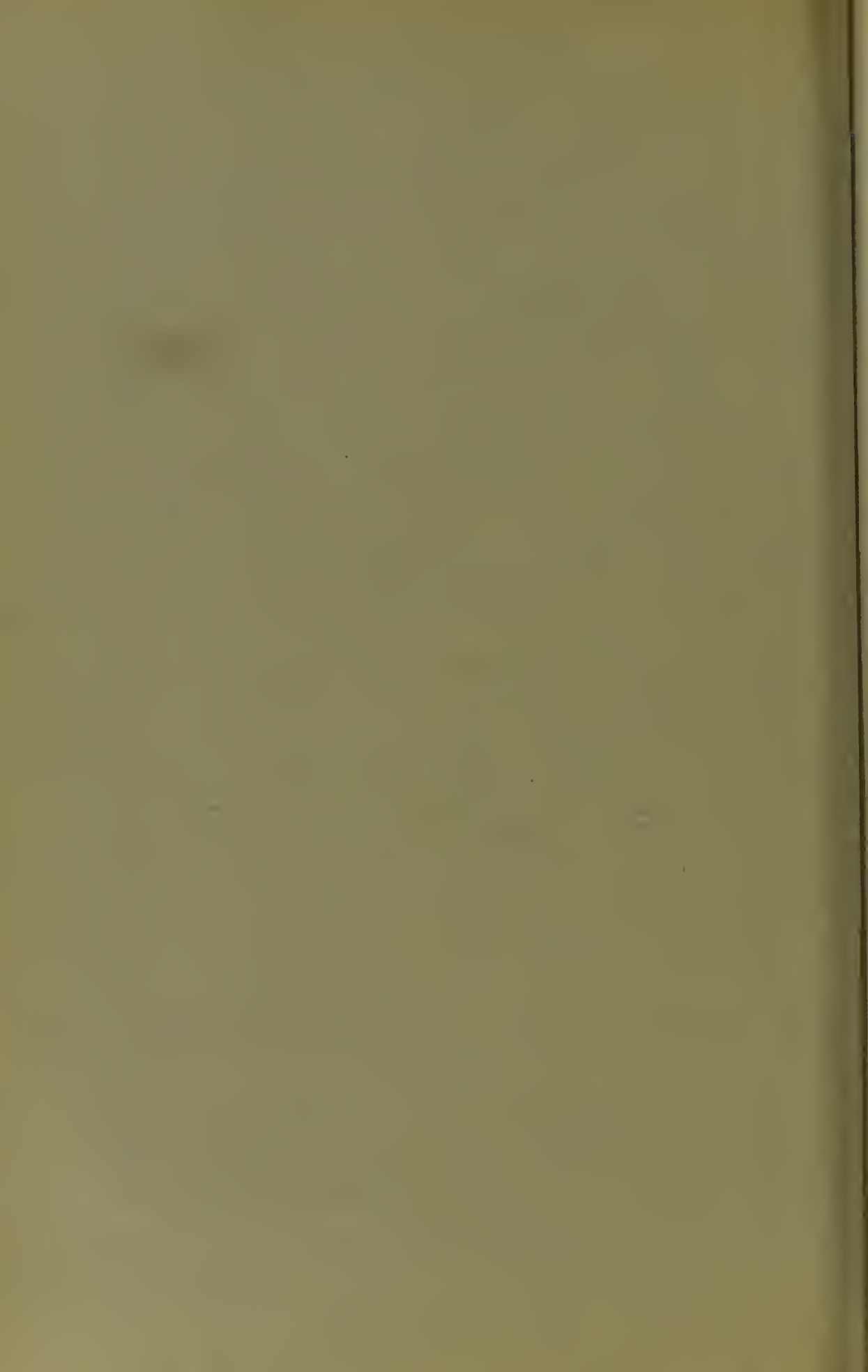
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SIXTY-EIGHT CASES OF PERNICIOUS ANÆMIA.

By

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THE cases of pernicious anæmia that were in Guy's Hospital previous to 1890 have already been recorded in these Reports by Dr. Addison, Dr. Pye-Smith, Dr. Frederick Taylor, and Dr. Hale White. The present article is a continuation of these records, embodying notes of the sixty-eight cases of the disease that were in the hospital between January, 1891, and December, 1908. The use of the term "pernicious anæmia" is purposely restricted to include no case that has not at one time or another exhibited oligocythæmia with a high colour index and no leucocytosis during life; or, if death occurred, a definite Prussian blue reaction in the liver.

THE PRUSSIAN BLUE REACTION.

(Perl's Test.)

The method of testing for the Prussian blue reaction is as follows: If a thin slice of the liver be immersed for five minutes in a 5 per cent. solution of potassium ferrocyanide, and then transferred to a 1 per cent. solution of hydrochloric acid, a Prussian blue colour begins to appear in about two minutes and goes on deepening for half an hour or more. The reaction, also spoken of as Perl's test, depends not only upon the presence of an excess of iron, but also upon that iron being in a sufficiently simple combination to respond to this ordinary chemical test.

If there is any doubt about the reaction at all, it is almost certainly not positive. Many conditions produce livers with

indeterminate greenish or greenish-blue reactions, but so far as is known at present, pernicious anæmia alone causes it to give the characteristic deep Prussian blue reaction of inorganic iron.

It is not the liver alone that gives this test ; the spleen and the kidneys often do so to an almost equal extent. Moreover, it is possible for the Prussian blue reaction to be extremely definite in the kidneys when the liver reaction by itself might be indeterminate. A case that was recently under Dr. Hale White showed the importance of this fact very clearly, for the kidney reacted so markedly to the Prussian blue test that there was no doubt as to the diagnosis of pernicious anæmia, although the liver in that particular case went but a greenish-blue colour instead of a deep Prussian blue.

The main features of the disease are so well known that there is no need to refer to them all in detail. In addition to the notes of the 68 cases themselves (pages 121 to 209), a summary of the various points presented by them will be found at the end of the paper, on pages 210 to 223. The particular features to which special attention may be directed here are the following nine :—

- i. The temperature charts of pernicious anæmia cases.
- ii. Pigmentation of the buccal mucosa in pernicious anæmia.
- iii. The size of the spleen in pernicious anæmia.
- iv. The nerve symptoms in pernicious anæmia.
- v. The gastro-intestinal symptoms in pernicious anæmia.
- vi. The state of the mouth in pernicious anæmia.
- vii. The variability of the colour index in pernicious anæmia.
- viii. The injustice of the epithet "pernicious" in some of the cases.
- ix. The great difficulty there is in accurately dating the beginning of the illness, with some thoughts that this difficulty suggests.

I.—THE TEMPERATURE CHARTS OF PERNICIOUS ANÆMIA CASES.

(Oral temperature.)

It is remarkable how constantly there is slight evening pyrexia in pernicious anæmia. This has often enough been noted before, and yet it is apt to escape the attention of medical students. As many of the charts as were available in the 68 cases under

discussion have here been reproduced, and three points about them stand out saliently, viz.: first, that when the patient is ill enough to be admitted to hospital it very seldom happens that there is not a rise to something between 99° and 100° F. every evening; secondly, that pyrexia exceeding 101° F. is possible in pernicious anæmia, though unusual unless there is some inter-current malady such as tonsillitis or pneumonia; and, thirdly, that there is little tendency to subnormal temperatures in the morning, especially if the records are made only at 10 a.m. and 6 p.m.

Judging from what happens in other asthenic conditions, such as those associated with chronic heart disease, for example, one would not have been surprised if the temperature in a severe case of pernicious anæmia had shown a tendency to be persistently subnormal; judging from what happens in cases of chronic sepsis, on the other hand, one might have expected a moderate degree of evening rise, but at the same time a considerable drop below normal in the morning. Neither of these types of temperature chart is at all like that of most cases of pernicious anæmia, however; in this disease it may be roughly said that the more the general condition of the patient improves under treatment the less does the tendency to evening pyrexia become; but that when the patient is decidedly anæmic and ill the condition is not like that of the great majority of pernicious anæmia cases unless the patient's temperature tends to rise to something between 99° and 100.5° F. every evening without any great fall below normal at 10 a.m. in the morning. Chart after chart taken from successive cases of pernicious anæmia shows this slight but persistent pyrexia. The smallness of the variation in temperature at different times of the day in some cases is well exemplified by four-hour charts, which exigencies of space have made it necessary to publish here in the reduced morning and evening form.

II.—PIGMENTATION OF THE BUCCAL MUCOSA IN PERNICIOUS ANÆMIA.

In the next place I should like to recall to memory the remarks made by Dr. Hale White before the first meeting of the

Association of Physicians of Great Britain and Ireland, upon a case of pernicious anæmia in which there were abnormal pigmentary deposits not only in the skin, but in the buccal mucosa. It is well known that Addison's disease and pernicious anæmia may present such similar symptoms that it is sometimes difficult to be sure which malady the patient is suffering from. It was formerly a generally accepted opinion that the presence of pigmentary deposits beneath the buccal mucosa inside the lips or cheeks would be decisive in favour of Addison's disease in such a case. Unfortunately this can no longer be maintained, for in at least two cases (No. 43, p. 173, and No. 53, p. 188) in which the diagnosis was confirmed by post-mortem examination, at which the suprarenal glands were normal, there was well-marked pigmentation of the buccal mucosa. Case 43 was the one in which Dr. Hale White himself observed the phenomenon; case 53 was mentioned by me in a paper before the Medical Society of London in 1909.

It may well be asked what rôle arsenic plays in the occurrence of this intrabuccal pigmentation in pernicious anæmia?

It is difficult to answer this question absolutely, but it seems that in the Manchester epidemic of arsenical poisoning such pigmentation within the mouth was not observed. Moreover, it is known that pathological pigmentation of the skin may occur in pernicious anæmia even when no arsenic has been given, so that seems to be no reason why it should not sometimes do so in the mouth also. Nevertheless, arsenic had been employed in the treatment of both the above cases, and therefore, although one can say that pigmentation of the buccal mucosa can occur in pernicious anæmia cases treated by arsenic, it is not possible to say absolutely that similar pigmentation can occur in pernicious anæmia cases in which no arsenic has been used.*

It may, perhaps, be added that the appearance of the buccal pigment is precisely similar to that seen in Addison's disease.

* Dr. H. D. Rolleston has recently shown a case of pernicious anæmia with buccal pigmentation previous to arsenical treatment, before the Royal Society of Medicine.

III.—THE SIZE OF THE SPLEEN IN PERNICIOUS ANÆMIA.

Passing next to a consideration of the size of the spleen in pernicious anæmia, it seems worth recording that although the general statement that the spleen is not enlarged as a rule may be true, nevertheless there are quite a number of cases in which the spleen is large enough to be readily palpated without any special expertness on the part of the observer. Clinically, out of sixty-eight consecutive cases there were twenty-four in which the spleen was felt with ease. The degree of enlargement may be compared with that which occurs in typhoid fever; in the greater number the spleen came below the costal margin for something between half an inch and two inches; in a few, however, the enlargement was greater, the spleen reaching down to below the level of the umbilicus in at least one.

The clinical observation of splenic enlargement in so considerable a proportion of pernicious anæmia cases is quite borne out by the results of post-mortem examinations; big spleens are often found after death, even when they were not felt during life.

The actual weights of the spleens are known for eighteen out of the total sixty-eight cases, and they vary from $3\frac{1}{2}$ ounces, or 105 grams, on the one hand, to 19 ounces, or 608 grams, on the other. Fourteen out of the eighteen weighed more than normal, and it is noteworthy that six out of them weighed no less than 10 ounces or more. The existence of a spleen that can be readily palpated is, therefore, by no means unlikely in pernicious anæmia, especially in the later stages of the disease. Too little stress is laid upon this point as a rule.

The fact that pernicious anæmia may be a cause for definite enlargement of the spleen clearly increases the number of other conditions with which, under certain circumstances, it might become confused.

Weight of the Spleen in Eighteen Consecutive Fatal Cases of Pernicious Anæmia.

(Normal weight 5 ounces, or 150 grammes.)

| CASE. | OUNCES. | GRAMS. |
|-------|---------|-----------------------|
| 35 | 3½ | 105 |
| 4 | 4 | 128 |
| 30 | 4 | 130 |
| 66 | 4½ | 146 |
| 33 | 5⅔ | 181 |
| 26 | 6½ | 207 |
| 39 | 7 | 221 |
| 13 | 7 | 224 |
| 32 | 8 | 246 (in a girl of 10) |
| 51 | 8 | 248 |
| 22 | 9 | 288 |
| 48 | 9½ | 306 |
| 10 | 10 | 320 |
| 25 | 10⅔ | 341 |
| 58 | 13 | 417 |
| 17 | 14 | 448 |
| 63 | 15⅔ | 500 |
| 11 | 19 | 608 |

IV.—THE NERVE SYMPTOMS IN PERNICIOUS ANÆMIA.

Nervous symptoms may not only be prominent in cases already known to be pernicious anæmia, but they may also antedate the recognition of the blood disease by weeks or months or even years. It is not altogether infrequent for a patient to attend at a hospital for symptoms which are regarded as those of ordinary locomotor ataxy, or of lateral sclerosis, for quite a long time before the cord changes are finally recognised as being associated with pernicious anæmia.

It is not uncommon to find various degenerations in the cord post-mortem, and when these are considerable the patient may have presented symptoms suggestive of spastic paraplegia, ataxic paraplegia, locomotor ataxia, or simple ataxia, according to which parts of the cord were most affected. Peripheral neuritis may also occur, but it is difficult to say to what extent this may be due to the arsenic that is employed in the treatment of the disease.

It is less common, perhaps, for the complete signs and symptoms of any of the named diseases of the spinal cord to present themselves than for irregular nerve symptoms to appear, many of which are subjective, and, therefore, apt to be regarded as purely functional. In case 1, for instance, severe pains in the back, diagnosed as lumbago for lack of a better name, had been a prominent symptom for years before the pernicious anæmia was recognised. In different cases the nerve signs and symptoms, exclusive of headaches, gastric pains, giddiness, or buzzing in the ears, which are doubtless due to the anæmia directly, were as follows :—

- Case 1. Lumbago and paresis of the legs. Many acute attacks of pain in the back. Reflexes natural.
- Case 4. Delirium with violence. Optic atrophy. Dr. Savage said symptoms were those of general paralysis of the insane.
- Case 5. Giddiness and a sense of something pumping inside his head.
- Case 7. Severe neuralgia. Pains in the back, in the limbs, and in the right flank.
- Case 8. Supra-orbital herpes.
- Case 9. Extensive peripheral neuritis, very probably alcoholic. Reaction of degeneration in all the muscles of the legs.
- Case 10. Knee-jerks absent; other reflexes natural. Drowsiness and Cheyne-Stokes respiration towards the end for some days.
- Case 11. Pains in the chest and abdomen; giddiness. Severe itching of skin.
- Case 14. Troublesome tingling of fingers and toes; aeroparæsthesia, but nerve reflexes natural.
- Case 15. Knee-jerks absent.
- Case 16. Tearing pains in his chest and abdomen, and feelings as though his body were being tightly gripped and squeezed. Reflexes natural.
- Case 17. No clinical signs, but degeneration of posterior columns post-mortem.
- Case 18. Thoracic pain. Anæsthesia of feet. "Could not feel sure of his foothold owing to numbness in his soles, so that he used to stumble like a drunken man sometimes." Knee-jerks natural.
- Case 20. Numbness of hands and feet. Buzzing noises in ears.
- Case 22. Knee-jerks decidedly exaggerated.
- Case 23. Loss of power in the legs. Very definite lateral sclerosis, first symptoms in case. Incontinence of urine. Knee-jerks exaggerated. Ankle clonus both sides. Also undue tingling of hands and arms.
- Case 25. Described as "neurotic and hysterical." Left knee-jerk just obtainable, right not obtained. Decided anæsthesia of all the finger tips.

- Case 26. Nervous system at first natural; but retention of urine before death.
- Case 27. Decided numbness of the fingers. Reflexes natural.
- Case 28. Concentrically contracted fields of vision. Optic neuritis. Knee-jerks difficult to obtain. Wasting. Shooting pains in arms and legs.
- Case 29. First treated for hypochondriasis. Numbness and tingling in finger tips. Knee-jerks absent, or very difficult to elicit. Pupils natural. Once hands and arms tossed about continually and everywhere. Expectoration in all directions, and fits of imbecile laughter.
- Case 30. Reflexes all natural. Much troubled by knocking noises in head and by giddiness on stooping. Everything she ate tasted sweet, even acid and salt things did.
- Case 32. Pains in limbs, especially calves of legs.
- Case 33. A tight feeling across the chest.
- Case 34. Both knee-jerks very brisk. Ankle clonus in one foot, not in the other.
- Case 36. Decided lateral sclerosis; prominent enough to be the early diagnosis. Knee-jerks both exaggerated. Ankle clonus, and Babinski's sign, both sides. Increased sensibility to heat and cold in patches of legs. No anæsthesia. Definite spasticity of legs.
- Case 38. Weakness of arms and legs; loss of control over defæcation.
- Case 42. Painful abdominal symptoms leading to diagnosis of "enteroptosis."
- Case 43. Anæsthesia to electrical stimulation of the legs; not to cutaneous sensibility. Both plantar reflexes extensor.
- Case 44. Greatly troubled by numbness of both hands and both feet.
- Case 46. Reflexes natural; but great numbness of fingers and toes; inability to put hand into cold water without fingers going dead, even in summer.
- Case 47. Marked numbness in hands and feet; attacks of sweating, giddiness, and blurred vision when at work, so that he had to clutch something to avoid falling. Knee-jerks unduly brisk, but plantar reflex flexor, and no clonus.
- Case 48. Latterly had become extremely nervous and irritable. Light-headed. Delusion as to bowl of flowers on table. Reflexes natural.
- Case 49. Four years ago her fingers began to tingle, this tingling soon spread to whole of body and legs. A year later, left leg became very weak and shaky, and some little time later her right leg followed suit. Noises in head very troublesome. Wrist, elbow, and knee-jerks all increased. Extensor plantar reflex on both sides. Ankle clonus and spasticity.
- Case 52. Right plantar reflex persistently extensor; though left was flexor. No ankle clonus.
- Case 53. Ringing in ears. Curious subjective sensation of paræsthesia, in particular, her thighs felt "too hot inside and too cold out," in a way which struck her as abnormal and inconvenient. Knee-jerks absent.

- Case 54. Sent to Insane Asylum on account of mania with delusions, impulsive and dangerous. Reflexes natural.
- Case 55. Curious feelings in legs from knees downwards, "as if walking in deep snow." Reflexes natural.
- Case 56. Started with pains in back and chest, spreading to buttocks and legs, and getting worse for three years. Reflexes natural. Suffered from a good many symptoms that were regarded as "neurotic."
- Case 60. Throbbing in head; pains in head; sleeplessness requiring sleeping draughts.
- Case 62. Reflexes natural, but patient complained of "weakness in every joint, and of a 'deadness' in the region of the joints."
- Case 65. Eyesight began to fail, without objective lesion; thought possibly tobacco amblyopia. Hands and feet "seemed to be numbed." Reflexes natural.
- Case 67. Pains in abdomen, head, and arms. Ordinary reflexes natural.
- Case 68. Much bothered by black spots in front of eyes, severe headaches, and great thirst. Knee-jerks very brisk, but otherwise reflexes natural.

These are the various nerve signs and symptoms presented by forty-four cases out of sixty-eight. The remainder did not spontaneously complain of anything similar, and nothing particular about the nervous systems attracted the attention of the ward clerks who wrote the reports. If forty-four out of sixty-eight cases present nerve symptoms, however, of degrees varying from subjective numbness of fingers and toes to definite spastic paraplegia, it is clear that there is at least a possibility of a case of pernicious anæmia now and then being treated solely for nerve trouble unless some stress is laid upon the well-known possibility of pernicious anæmia being associated with pathological changes in the spinal cord and peripheral nerves.

V.—GASTRO-INTESTINAL SYMPTOMS IN PERNICIOUS ANÆMIA.

In view of Dr. William Hunter's opinion that pernicious anæmia is a specific disease due to a hæmolysing poison or toxin derived from the alimentary canal, the prevalence or otherwise of gastro-intestinal symptoms in the earlier stages of the malady becomes one of considerable interest. Dr. Hale White, in his paper on pernicious anæmia in Vol. XLVII. of these Reports

(1890), laid particular stress upon this, and after careful consideration of each case states, "We may therefore conclude that dyspeptic symptoms, particularly vomiting and diarrhœa, are very common in genuine pernicious anæmia, being present in almost half the cases, that they are often very severe, and that constipation is one of the least common of the dyspeptic symptoms." This conclusion is more than borne out by the present cases, although there is a definite number of them in which gastro-intestinal symptoms are entirely absent. In nine of the total sixty-eight they are not mentioned (cases 4, 12, 20, 42, 43, 51, 54, 64 and 68); in fourteen others they are definitely mentioned as not present (cases 3, 6, 9, 10, 15, 16, 18, 25, 26, 31, 56, 57, 67 and 68), although in six of these diarrhœa or vomiting developed after arsenical treatment had been adopted (cases 3, 10, 18, 56, 67 and 68); whilst in the remaining forty-five there were definite gastro-intestinal symptoms comparatively early, and presumably before arsenical treatment was begun. It needs to be borne in mind, of course, that many maladies cause "indigestion," and also that diarrhœa is more significant than vomiting, seeing that the latter may be due directly to the anæmic state, especially when an anæmic person tries to exert himself beyond his physical powers—so-called "anæmic vomiting." Nevertheless the following summary of the gastro-intestinal symptoms, in forty-five out of sixty-eight consecutive cases, strongly suggests that they are connected in a direct and important way with the pathology of the disease:—

- Case 1. Diarrhœa and loss of appetite.
- Case 2. Bilious attacks and vomiting of bile. Severe diarrhœa.
- Case 5. Bilious attacks and vomiting on and off for years; severe bouts of diarrhœa.
- Case 7. A marked case of vomiting. Also "for twenty-five years every little thing has seemed to cause diarrhœa."
- Case 8. Bilious attacks. Severe diarrhœa, on one occasion suggesting cholera.
- Case 11. Severe diarrhœa each year. At other times fæces are small hard globular masses like iron rust.
- Case 13. Diarrhœa, severe enough to be diagnosed as cholera.
- Case 14. Diarrhœa for a long while past, up to as many as fifty motions a week.
- Case 17. "English cholera." Severe vomiting. Has to be very careful of diet or suffers severe abdominal attacks and diarrhœa.

- Case 19. "Indigestion" for years.
- Case 21. Vomiting, especially in the morning.
- Case 22. Very troublesome nausea and vomiting.
- Case 23. Diarrhœa and vomiting.
- Case 24. Persistent and severe diarrhœa for three and a half years.
- Case 27. A decided tendency to diarrhœa. "Indigestion very readily produced."
- Case 28. Vomiting.
- Case 29. Constipation and vomiting.
- Case 30. "Indigestion" for years.
- Case 32. Vomiting bouts.
- Case 33. Diarrhœa. Ulcerative colitis (q. v.).
- Case 34. Dyspepsia; alternate bulimia and anorexia; vomiting.
- Case 35. Constipation so severe that plumbism was diagnosed owing to occupation as painter.
- Case 36. Severe diarrhœa.
- Case 37. Vomiting.
- Case 38. Vomiting and diarrhœa.
- Case 39. Vomiting. Chronic colitis (q. v.).
- Case 40. Severe "bilious attacks."
- Case 41. Severe bouts of diarrhœa, the first of which was so severe that typhoid fever was diagnosed.
- Case 44. Vomiting after food. Constipation.
- Case 45. Vomiting on the least thing. Severe diarrhœa.
- Case 46. Vomiting, diarrhœa, and "indigestion" on and off for four years. One attack taken for "enteric fever" at Naples.
- Case 47. Vomiting bout, quite sudden in onset.
- Case 48. Diarrhœa on and off for a year.
- Case 49. Severe diarrhœa.
- Case 50. Constipation very troublesome.
- Case 52. Vomiting and severe diarrhœa for which the patient was warded in Guy's a year before pernicious anæmia was recognised.
- Case 53. Loss of appetite and "dyspepsia."
- Case 55. "Bilious vomiting" without diarrhœa.
- Case 58. No diarrhœa; vomiting so severe that nothing but plain water could be kept down. Admitted to the surgical side with a view to gastro-jejunostomy for ulcer. No gastric lesion present at post-mortem examination.
- Case 59. "Dyspepsia" for five years. Severe diarrhœa and vomiting for four months.
- Case 60. Dyspepsia for two years; all the teeth removed with a view to curing this. Vomiting on and off for ten weeks.
- Case 61. Vomiting after food.
- Case 62. "Dyspepsia" for eleven years. Teeth removed on this account. Recent diarrhœa, but arsenical treatment well borne, up to eleven minims of the liquor thrice daily.
- Case 63. "Gastric ulcer symptoms precisely like those of an attack years before." Vomiting, even of fluids. Hæmatemesis.
- Case 66. "Indigestion" for ten years; many teeth extracted on account of this.

Gastric HCl.

There is a note as to the gastric HCl. in three cases (Nos. 51, 57 and 68). In the first free HCl. was abundant, in the second "deficient," in the third "absent."

VI.—THE MOUTH IN PERNICIOUS ANÆMIA.

The prevalent view as to the relationship between a septic state of the tooth sockets, gums or mouth and pernicious anæmia is that this sepsis causes, not "pernicious" but "septic" anæmia, the latter having a low colour index even if it reaches a severe degree. Some hold, however, that this "septic" anæmia is one of the conditions which particularly predisposes the patient to suffer from the effects of that unknown gastric or intestinal toxin which is supposed to be the specific cause of pernicious anæmia itself. In short, oral sepsis causes "septic anæmia," and "septic anæmia" predisposes to pernicious anæmia. The commonness of carious and dirty teeth amongst pernicious anæmia cases in hospital cannot be gainsaid, but then nearly every hospital case, whatever the disease for which he is admitted, has faulty teeth. If the latter were a potent cause of pernicious anæmia it should be a common malady. So often, however, are the teeth referred to in text-books as being particularly septic and carious in this disease that special stress may perhaps be laid upon the fact that the existence of a well-cleansed set of natural teeth in good repair by no means rules out the diagnosis of pernicious anæmia. Thus in case 9 there was a special note that "the teeth are in excellent condition." In case 10 "the teeth were in excellent condition, and only two were missing." In case 14, "The teeth are good and the mouth is clean and sweet." Case 15, "Mouth clean. Teeth noted as being exceptionally good." Case 21, "The teeth were all good." Case 37, "Mouth clean and teeth in particularly good order." Case 41, "Teeth and mouth in remarkably good order." Case 44, "A good clean mouth and clean teeth." Cases 16 and 29 were entirely edentulous from age—61 and 67 years respectively—and case 59 was, curiously enough, a dentist.

Lest the cases above should convey the erroneous impression that the teeth are apt to be particularly good, it is only right to give the following notes from the remaining cases in which their condition is mentioned:—

- Case 5. Tongue and mouth clean, but pallid.
- Case 7. Tongue clean, but teeth in a bad state.
- Case 17. Tongue sore and throat parched.
- Case 18. Teeth in very fair order.
- Case 23. Mouth clean, but teeth in only fair condition.
- Case 25. Teeth in a very bad state.
- Case 27. Teeth good, but black from smoking.
- Case 30. Teeth scanty, but those left are clean; no stomatitis.
- Case 31. Teeth carious and in poor condition; mouth so sore that the patient could not smoke at all during five weeks previous to admission.
- Case 34. Teeth much decayed.
- Case 35. Breath foul; furred, flabby tongue; carious teeth.
- Case 36. Teeth decayed and very septic.
- Case 39. Teeth in a bad state, but only so since taking medicine, according to the patient.
- Case 45. Started with very septic sore throat.
- Case 46. Considerable pyorrhœa alveolaris.
- Case 47. Teeth few; but those left were clean and healthy.
- Case 48. Mouth dirty and teeth bad.
- Case 49. No teeth of her own, but a good set of false ones.
- Case 50. Teeth carious, but mouth clean, as the patient had long been in the habit of using potassium permanganate as a mouth wash.
- Case 51. Teeth had been very carious, but they had been replaced by dentures.
- Case 53. Purulent tooth sockets.
- Case 54. Teeth carious.
- Case 55. Teeth bad and tongue coated.
- Case 56. Teeth very septic and outstanding from gums, and tongue coated white.
- Case 57. Teeth not very bad, but not clean, and several carious.
- Case 59. A dentist. The teeth had been good until four months before admission, but now they were not so good, and there were sore ulcers inside the cheeks where the latter impinged against the bad teeth.
- Case 60. Teeth all removed two years before for dyspepsia.
- Case 61. Had been having trouble with teeth for two years. Alveolar abscess at one time. Stumps left were very septic.
- Case 63. Mouth clean, but teeth decayed.
- Case 65. Clean mouth, but many teeth carious.
- Case 66. Six years before admission had been supplied with false teeth for the cure of long-standing dyspepsia. Now came in to a surgical ward for necrosis and gangrene of the jaw after tooth extraction. Died in a week.

Case 67. Teeth carious and much pyorrhœa alveolaris, though rest of mouth clean.

Case 68. Several decayed teeth had to be removed, but mouth in general clean ; much thirst.

VII.—THE VARIABILITY IN THE COLOUR INDEX IN PERNICIOUS ANÆMIA.

The final clinical criterion of pernicious anæmia at present is the occurrence of a high colour index with oligocythœmia, and without leucocytosis. It is very important to realize, however, that the fact that the colour index proves to be low, or at least not high, when the blood is examined once only, or even more than once, is no proof that the condition is not one of pernicious anæmia ; for when a series of blood counts are made at intervals in the same case with the best instruments at our disposal, it is comparatively common to find that there are periods when the colour index is less than one, as well as other periods when it is greater than one. Roughly speaking, the index tends to be highest when the patient is most ill and anæmic, and to become lower as the condition improves. This is no absolute rule, however, for a high colour index may persist even when much improvement has occurred, and, on the other hand, a low index is sometimes found when the patient is very ill.

It is astonishing how quickly the index may vary ; even when the instrumental error is reduced to a minimum in the hands of skilled observers there may be a high colour index one week and a low one the next ; such radical changes in the character of the blood have been attributed to derangements known as “blood storms.”

The blood counts will be found appended to the abstract of the report of each patient at the end of this article, and many of them serve to demonstrate the fact that a pernicious anæmic blood may have a low colour index at times. I may add, perhaps, that the diagnosis was in more than one such case confirmed by autopsy, so that there can be no doubt as to correctness upon that score. To pick a case almost at random, No. 45 shows variations in the colour index from as low as 0·791 to as high as 1·750, and out of

the five counts made at intervals, two were greater and three were less than one. Case after case shows the same kind of thing (see page 221). I think the point is one of great importance. It unfortunately adds to the difficulty of diagnosis, but it teaches that pernicious anæmia is not by any means to be excluded by a single blood count.

VIII.—THE INJUSTICE OF THE EPITHET “PERNICIOUS” IN SOME OF THE CASES.

An entirely different matter now presents itself for discussion, and that is, the injustice of the epithet “pernicious” in some of the cases.

Pernicious, in its lay sense, is a very strong term, and its use leads the medical student to gather an erroneous idea of the prognosis in pernicious anæmia. It is true that hardly any patients in whom typical pernicious anæmia has developed ever become completely well again. It is also true that the fatal ending of the disease sometimes comes within a month or a few months of what seems to be the beginning of the disease. On the other hand, the average duration of pernicious anæmia, from the time of its recognition until the patient dies, is in a fair number of cases to be measured in years rather than in weeks or months, besides which the illness is not one of continuous downward progress like that of carcinoma of the stomach, for example, for nothing in medicine perhaps is so striking as the way in which, even if the rally be only temporary, a patient who may seem to be *in extremis* from pernicious anæmia, with his red corpuscles under 20 per cent. of normal, may recuperate, not only once, but sometimes several times. If one were condemned to suffer from a fatal malady, but were given the choice between malignant disease of the upper part of the alimentary canal, for example, on the one hand, or from pernicious anæmia on the other, it is clear that in either case one might be dead within the year, but that if one chose pernicious anæmia one would have a better chance than with gastric carcinoma of living for several years.

The intervals between the recognition of the pernicious anæmia by blood count and the time of death in the fifty-one cases in which, out of the total sixty-eight, the ultimate fate of the patient is known, were as follows:—

One year or less, thirty cases:—

Less than one month, eight cases (Nos. 22, 26, 32, 40, 58, 61, 63, 66).

One to three months, eight cases (Nos. 4, 9, 17, 24, 29, 37, 51, 60).

Three to six months, five cases (Nos. 10, 25, 33, 46, 56).

Six to twelve months, nine cases (Nos. 12, 13, 14, 23, 27, 35, 39, 49, 65).

One to two years, thirteen cases:—

Twelve to eighteen months, nine cases (Nos. 3, 20, 28, 42, 44, 48, 52, 53, 55).

Eighteen to twenty-four months, four cases (Nos. 8, 18, 30, 41).

Two to nine years, eight cases:—

Two to three years, four cases (Nos. 11, 34, 43, 57).

Three to four years, two cases (Nos. 36, 47).

Up to nine years, two cases (Nos. 1, 7).

It is important to remember that the above figures apply to the time that elapsed between *recognition* of the disease and its termination; the duration from the earliest symptoms is often much longer, as will be discussed immediately.

It will be seen that thirty cases died within the year, but that twenty-one survived for one year or more, eight out of fifty-one cases living for something between two and nine years after the time when pernicious anæmia had been diagnosed beyond doubt. The word “pernicious” is rather too strong to be applied to a condition in which the prognosis, though bad, is no worse than this. Lymphatic leuchæmia is far more pernicious a complaint than is pernicious anæmia. I should like to see the older term, “Addison’s anæmia,” used instead.

It will be said that I have picked out a particularly favourable case when I refer the reader to the notes about Charles R. (Case No. 1, page 121). The allegation is true, but his story illustrates so well both the power some of these patients have of rallying, and also the length of time they may survive, and, further, the fact that their initial symptoms—lumbago in this case—may not seem to have any relation to a blood disease, that I venture to draw special attention to it.

IX.—THE DIFFICULTY FREQUENTLY MET WITH IN ACCURATELY
DATING THE BEGINNING OF THE ILLNESS, WITH SOME
THOUGHTS THAT THIS DIFFICULTY SUGGESTS.

I have just referred to the length of time that elapses in different cases between the recognition of the pernicious anæmia and the death of the patient. The recognition of the disease is chiefly by means of blood counts; but I should like to lay great stress upon the fact that in the majority of cases the blood count recognition by no means coincides even with an early stage of the disease, much less with its actual beginning. When one reads through the impartial histories of these cases as recorded by medical ward clerks, one is struck again and again by the fact that symptoms have been present for months, years, or even many years, before the anæmia itself becomes pronounced. I quite grant that there are a few cases which seem to be acute (*e.g.*, Nos. 6 and 50); in most cases, however, the onset is quite insidious, and in quite a number the earlier symptoms are attributed to some entirely different malady, typhoid fever, for example (case 46), or English cholera when diarrhœa was a prominent symptom (cases 13 and 17); a chronic nerve disease (case 36); functional or organic disorder of the stomach (case 63); and so on.

The sixty-eight consecutive cases themselves dated their illness back for at least the following lengths of time prior to its recognition:—

For less than one month in three cases (Nos. 6, 47, 50).

Between one and three months in seven cases (Nos. 9, 10, 26, 30, 48, 51, 61).

Between three and six months in three cases (Nos. 18, 35, 45).

Between six and nine months in eight cases (Nos. 20, 31, 34, 37, 53, 55, 57, 63).

Between nine and twelve months in four cases (Nos. 22, 33, 54, 58).

Between one and two years in eight cases (Nos. 23, 25, 27, 28, 44, 52, 65, 67).

Between two and three years in seven cases (Nos. 2, 3, 4, 38, 41, 42, 60).

Between three and four years in four cases (Nos. 16, 24, 29, 56).

Between four and five years in seven cases (Nos. 7, 8, 12, 21, 32, 46, 49).

Between five and six years in two cases (Nos. 11, 59).

Between six and seven years in two cases (Nos. 13, 15).

Between seven and eight years in three cases (Nos. 17, 36, 39).

Between eight and nine years in two cases (Nos. 40, 64).

Between ten and eleven years in one case (No. 14).

Between eleven and twelve years in two cases (Nos. 62, 66).

Between fifteen and sixteen years in one case (No. 1).

In case 19 it was "some years;" in case 43 it was "long and indefinite;" in case 26, classed above as two months, it may really have been twenty years; in case 7, classed above as four to five years, it may really have been twenty-five years; in case 8, classed above as four to five years, it may really have been twenty-six years; whilst in case 5, classed above as six to seven years, it may really have been no less than forty-four years.

I should like to recall the case of Charles R. (No. 1), quoted just now, to illustrate what I mean. I see no lack of continuity in the history of his case from the original attacks of what appeared to be "lumbago" sixteen years before pernicious anæmia was diagnosed, to the patient's death from the latter disease, eight years after it was recognised by blood counts.

There are many other examples of similar difficulty in deciding when the pernicious anæmia really began, as will be seen if the detailed notes of the cases are consulted.

In the case of Annie P. (No. 46) for example, on inquiring into the nature of the "typhoid fever," it transpired that the symptoms were mainly diarrhœa and pyrexia, and that the patient was kept in bed for it for only four days. It seems clear, I think, that some name had to be given to an obscure febrile illness, and that typhoid fever seemed to fit it at first; but time showed, I think, a direct continuity between that illness and undoubted pernicious anæmia.

It might be urged that pernicious anæmia was not really present at the time of the "enteric" attack, but that the latter predisposed to it, and was in a way its cause. I think, however, that our clinical knowledge of the disease is more likely to be advanced if we allow that the lumbago in the case of Charles R., and the diarrhœa and pyrexia in that of Amelia P., and other symptoms in other cases, were really the earliest symptoms of a disease of which the later stages are characterised by profound anæmia, a high colour index, and a Prussian blue reaction in the liver. If this be so, then pernicious anæmia is the name for but a late phase of a more general disease, which is at present unnamed. I would suggest a comparison between it and phthisis in this respect. It is not so very many years since it

was impossible to diagnose early phthisis, and consumption was regarded as essentially fatal because it was only recognised when it had already passed beyond the stage when it was curable. The end of a phthisical person may even now be very rapid by galloping consumption, comparable to the acute cases of pernicious anæmia; or the end may be gradual with periods of recovery and relapse extending over months or years, comparable to the course of ordinary pernicious anæmia as we now understand that term; on the other hand, if recognised at a stage at which our grandfathers would have denied the existence of phthisis altogether, consumption may be completely cured; healed phthisis is found in a large proportion of post-mortem examinations at a general hospital in patients who may never have been suspected to have had phthisis at all. I feel sure that pernicious anæmia as we know it is but a late stage of that which may be much commoner than we think, recovering spontaneously, perhaps, in many cases as phthisis does in others, breaking out into an acute phase in others, running a subacute or chronic up-and-down course in yet others. We are now able to recognise phthisis early, by bacteriological and other means, in a way that our forefathers could scarcely have believed possible. I hope that similar early recognition of pernicious anæmia will also become possible as time goes on. It is recognised far earlier now than it used to be; and perhaps if it were thought of and diagnosed earlier still, some at least of the patients might be cured. The two factors in diagnosis to which it would seem that special attention should be directed are the blood on the one hand and urobilin in the urine on the other.

CONCLUSION.

In conclusion, the chief points that an attempt has been made to bring out in this paper are: first, that some evening pyrexia is seldom absent in pernicious anæmia cases that are decidedly ill; secondly, that pigmentation within the mouth of precisely similar character to that seen in Addison's disease may occur in pernicious anæmia cases treated with arsenic; thirdly, that the spleen is to be felt in about one-third of the cases, and that it

is really enlarged; fourthly, that nerve symptoms are not at all uncommon in pernicious anæmia; fifthly, that gastro-intestinal symptoms, particularly vomiting, diarrhœa, and "bilious attacks," occur early in more than one-half the cases, though in others they may be entirely absent; sixthly, that although there is often oral sepsis, pernicious anæmia may develop in the presence of apparently perfect teeth; seventhly, that the colour index, though typically higher than 1 when an advanced stage of the disease has been reached, is not always nor continually high, especially during a period of improvement in the patient's condition, when it may be actually low; and lastly, that pernicious anæmia as we now know it is very possibly only a late and almost incurable stage of a disease which it is to be hoped will some day be recognisable early enough to be cured.

(For the summary of the other points presented by the cases see pages 210 to 223.)

ABSTRACTS OF THE NOTES OF THE SIXTY-EIGHT CASES.

[N.B.—When no mention is made of any particular point, it signifies that there was no mention of it in the original report. If, for instance, "urobilin" is not mentioned, it cannot be assumed to have been absent; if it had been looked for and not found it would be mentioned as "no urobilin found," and so on.]

(The References are to the Medical Ward Reports.)

CASE 1.—Ref. Nos., Vol. 109, No. 89; Vol. 114, No. 64; Vol. 123, No. 104; Vol. 147, No. 96; Vol. 153, No. 113.—Charles R., æt. 45; a brick-layer. First admitted under Dr. Pavy, in 1889, for mental irritability, weakness in the legs, and pain in the lumbar region. His colour at that time was not apparently abnormal, and the diagnosis made was *lumbago and paresis of the legs*. The pains in the back were very acute, and the patient had had three or four attacks a year for the previous fifteen years. There was no hæmaturia nor other indication that the pains might have been due to renal colic, and lumbago seemed to fit the case. In view, however, of its subsequent course it seems at least possible that the pains were similar to those which other pernicious anæmia cases often complain of in one part of the body or another. Less than a year later, in January, 1890, the patient was re-admitted, under Dr. Pavy, for loss of physical strength, failure of appetite, diarrhœa, and night sweating, and the skin was now pale and waxy, and had been obviously so for more than two months. The lungs and heart were natural. There were no retinal hæmorrhages, but occasional specks of blood were expectorated. There was no other bleeding. The urine was high coloured; it contained no albumin, blood, nor sugar. The blood count indicated pernicious anæmia. The patient was treated with *pilula colocynthi et hyoscyami*, and *mistura ferri et ammonii citratis*, and improved in general condition, though the blood count remained much the same. By September, 1891, the patient was so weak that he could not work, though he had worked between his discharge and then. He was re-admitted, under Dr. Washbourn, and was in hospital from September 4th, 1891, to November 30th, 1891. The attacks of pain in the loins were still continued, and they were very bad. There were neither enlarged glands nor spleen, no vomiting, and no diarrhœa. Treatment was now by means of *liquor arsenicalis*, which was increased up to *mix.* three times a day, with material relief to the anæmia. He went out in November, 1891, and remained well enough to work, on and off, for over four years, before repetition of his old weakness and pallor compelled him to seek hospital treatment again. He was under Dr. Hale White, in Clinical Ward, from February 7th, 1896, to March 9th, 1896. He presented the typical pale yellow colour. His tissues

were flabby, but not wasted. The urine sometimes exhibited a marked urobilin band spectroscopically, sometimes none. The temperature was typically up to 100° F. every night, and not below 98° F. in the morning as a rule. The nervous reflexes were natural. Arsenical treatment was adopted, and some relief ensued. He was discharged able to walk about, but unable to do labourer's work. He slowly relapsed, and was readmitted, under Dr. Goodhart, on March 1st, 1897. He seemed to get progressively worse, and yet he lived for two years after his discharge on May 20th, 1897. Mrs. R. writes, on August 15th, 1907: "Mr. R. died two years after leaving Guy's Hospital, suffering from prostration and great pains in his head; it was indeed sad to see such suffering, and the brain very much affected." During his last stay in hospital the temperature was again typically between 99° F. and 100° F. each night. The spleen, formerly not felt, now came two inches below the ribs, and the liver came one inch below the costal margin in the right nipple line. Ophthalmoscopic examination revealed neither optic neuritis nor retinal hæmorrhage. The blood counts were as follows:—

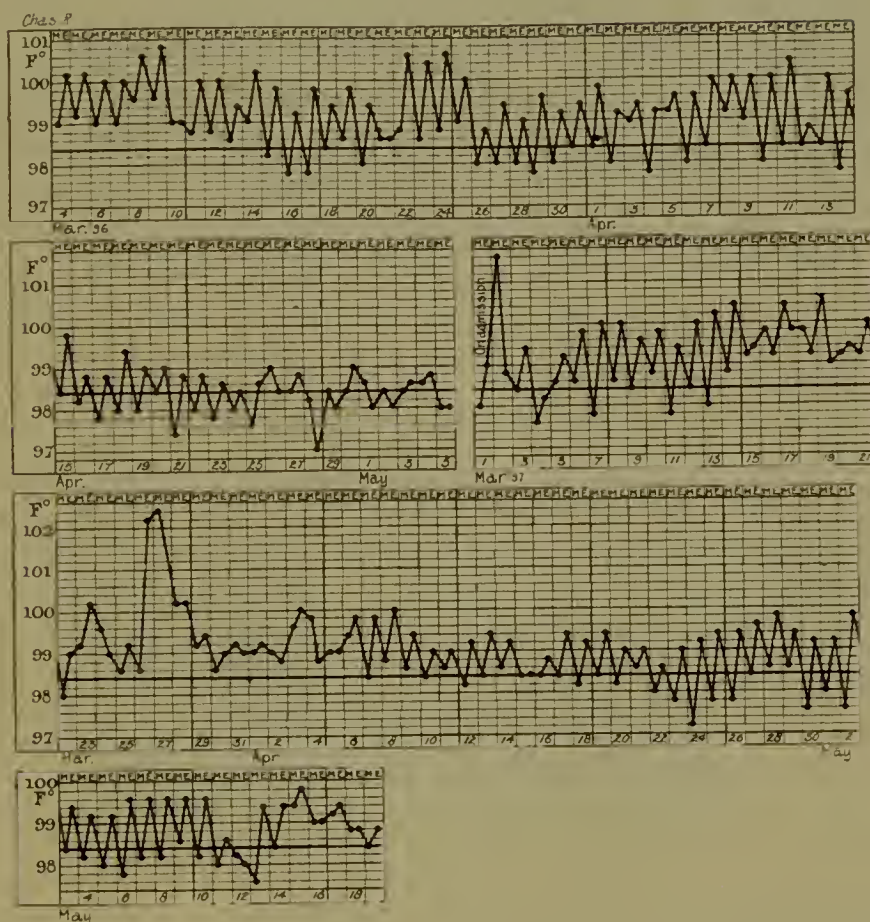
| Date. | Red corpuscles, per cub. mm. | Red corpus- cles, per cent. of normal. | Hæmoglobin, per cent. of normal. | Colour index. | Leucocytes per cub. mm. |
|-----------------|---------------------------------|--|--|---------------|-------------------------------|
| February, 1890 | 2,400,000 | 48 | 53 | 1·104 | — |
| March, 1890 | 2,400,000 | 48 | 55 | 1·148 | — |
| 18 Sept., 1891 | 1,400,000 | 28 | 28 | 1·000 | — |
| 25 " " | 1,100,000 | 22 | 25 | 1·136 | — |
| 5 October, 1891 | 1,800,000 | 36 | 35 | 0·972 | — |
| 19 " " | 2,100,000 | 42 | 35 | 0·833 | — |
| 26 " " | 1,800,000 | 36 | 36 | 1·000 | — |
| 29 " " | 1,800,000 | 36 | 40 | 1·111 | — |
| 31 " " | 2,000,000 | 40 | 40 | 1·000 | — |
| 2 Nov. " | 2,900,000 | 58 | 50 | 0·862 | — |
| 9 " " | 3,350,000 | 67 | 60 | 0·895 | — |
| 7 Feb., 1896* | 1,250,000 | 25 | 30 | 1·200 | — |
| 13 " " | 1,500,000 | 30 | 35 | 1·166 | — |
| 18 " " | 1,500,000 | 30 | 35 | 1·166 | — |
| 24 " " | 1,250,000 | 25 | 30 | 1·200 | — |
| 27 " " | 1,200,000 | 24 | 30 | 1·250 | — |
| 9 March " | 1,000,000 | 20 | 25 | 1·250 | — |
| 19 " " | 800,000 | 16 | 25 | 1·562 | — |
| 8 April " | 700,000 | 14 | 20 | 1·429 | — |
| 22 " " | 1,500,000 | 30 | 30 | 1·000 | — |
| 2 May " | 2,150,000 | 43 | 32 | 0·744 | — |
| 9 " " | 2,750,000 | 55 | 38 | 0·691 | — |
| 11 March, 1897† | 3,000,000 | 60 | 30 | 0·500 | ‡ |
| 22 " " | 1,900,000 | 38 | 25 | 0·659 | — |
| 5 April " | 1,050,000 | 21 | 15 | 0·714 | — |
| 12 " " | 650,000 | 13 | 16 | 1·231 | — |
| 27 " " | 700,000 | 14 | 26 | 1·857 | — |

* Marked poikilocytosis.

† Many megalocytes and poikilocytosis, and some nucleated red cells.

‡ No leucocytosis.

The temperature chart was as follows :—



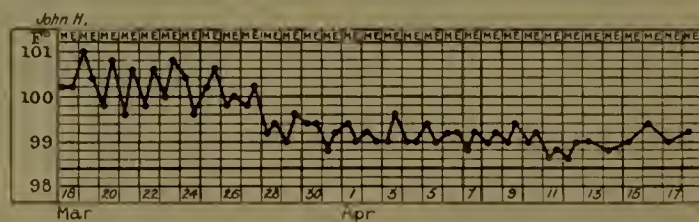
CASE 2.—Ref. No., Vol. 120, No. 49.—John H., æt. 40, a coachman by occupation, and a hard worker, was in hospital under the care of Dr. Taylor from March 17th to April 25th, 1891; attempts to trace him since then have failed. He began to ail two years previous to admission. Up till then he had enjoyed robust health. Without apparent cause he developed a gradual inability to perform his physical work with so much energy as usual, and he had occasional attacks of vomiting, bringing up bile-stained fluid, but no blood. He also had severe diarrhœa, and after these symptoms began there was œdema of his feet. Both diarrhœa and vomiting had been present more or less all the time. The heart was of normal size, but exhibited a hæmic systolic bruit at the impulse and in the pulmonary area, and over the veins in the neck. The lungs were natural. There was a certain amount of eczema of the scrotum. The only hæmorrhages were those in the retina, where there were many. Neither liver nor spleen could be felt. The urine was of a pale sherry colour, and had a specific gravity of 1014; it contained no albumin, sugar or blood. Neither indican nor urobilin were mentioned.

The skin was of the typical primrose colour, and it had no undue pigmentation. The patient's weight was 140 lbs. When in bed he improved rapidly under arsenical treatment, though previously, while he remained up and about, he had been going down-hill under similar treatment. How long his improvement lasted is not known.

| Date | Red corpuscles, per cub. mm. | Red corpus- cles, percent. of normal. | Hæmoglobin, per cent. of normal. | Colour index. | Leucocytes per cub. mm. |
|----------------|---------------------------------|---|--|---------------|-------------------------------|
| 21 March, 1891 | 1,600,000 | 32 | 36 | 1.125 | — |
| 31 " " | 1,500,000 | 30 | 32 | 1.066 | — |
| 16 April, " | 2,300,000 | 46 | 58 | 1.261 | — |
| 25 " " | 3,200,000 | 64 | 70 | 1.094 | — |

Note.—Films showed an extreme degree of poikilocytosis.

The temperature chart was as follows:—

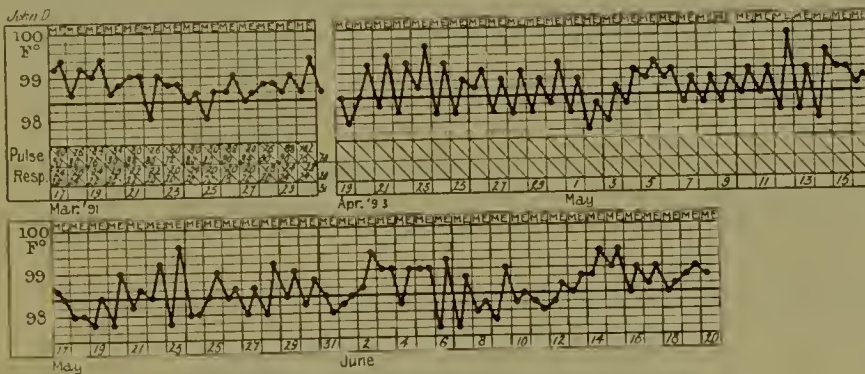


CASE 3.—Ref. Nos., Vol. 119, No. 76, and Vol. 133, No. 175.—John D., æt. 57, a farm labourer, was first admitted under Dr. Pye-Smith in 1891 for piles, weakness and swelling of his hands, feet, and scrotum, with evidence of ascites, a local systolic apical bruit, a liver that could be felt one inch below the costal margin, but no palpable spleen; the urine was free from albumin. During his stay in hospital that year the red corpuscles rose from sixteen per cent. of normal to sixty per cent. No definite diagnosis was made beyond "severe anæmia, probably due to loss of blood from hæmorrhoids." The patient remained well for two years; but seven weeks before his re-admission in 1893 he had to take to his bed again, as he was too weak to walk. He was re-admitted on April 19th, 1893, and re-discharged relieved on June 21st, 1893. He had the typical lemon-yellow colour, and was extremely weak though well covered. There was moderate œdema of the ankles, and possibly slight ascites. The temperature was usually 99° or over each night. There were no retinal nor other hæmorrhages. The urine contained neither albumin nor urobilin. Flatus and diarrhœa became so troublesome when arsenic was given that it had to be stopped; oxygen inhalations seemed to do good. He relapsed soon after his discharge, and was admitted to Hendon Infirmary under the name of John Elliott, alias John Duke; he was buried from Hendon Union on April 17th, 1894. The blood counts were as follows:—

| Date. | Red corpuscles, per cub. mm. | Red corpus- cles, per cent. of normal. | Hæmoglobin, per cent. of normal. | Colour index. | Leucocytes per cub. mm. |
|--------------------|---------------------------------|--|--|---------------|-------------------------------|
| | Thoma Zeiss. | | Gowers. | | |
| On admission 1891 | 800,000 | 16 | — | — | — |
| On discharge 1891 | 3,000,000 | 60 | — | — | — |
| 20 April, 1893 ... | 880,000 | 18 | 30 | 1·666 | * |
| 26 " " | 880,000 | 18 | 33 | 1·833 | — |
| 4 May, " | 1,400,000 | 28 | 33 | 1·179 | — |
| 10 " " | 1,450,000 | 29 | 35 | 1·207 | — |
| 18 " " | 1,750,000 | 35 | 40 | 1·143 | — |
| 25 " " | 1,750,000 | 35 | 35 | 1·000 | — |
| 1 June, " | 1,100,000 | 22 | 38 | 1·727 | — |
| 8 " " | 1,500,000 | 30 | 36 | 1·200 | — |

* There was no leucocytosis.

The temperature chart was as follows:—



CASE 4.—Ref. No., Vol. 123, No. 105; Post-mortem No. 127, 1891.—Ann W., æt. 55, a housewife, was sent up to Guy's Hospital as a case of "jaundice." A married woman, she had been "jaundiced" thus for two years, off and on, during which time she had been several times incapacitated by severe attacks of diarrhœa. In the interval between these attacks she was liable to constipation. She was admitted into Clinical, under Dr. Perry, on March 20th, 1891, and she died on April 12th, 1891. During the fortnight before she came in she had vomited five times, and latterly she had become delirious and violent. Her pulse rate varied from 96 to 120, her respiration rate from 16 to 20, and her temperature was seldom below 99° F. and seldom above 100° F., though three times it reached 101·6° F. She was not jaundiced at all. The skin was the typical colour of pernicious anæmia. The bones were not tender. Neither liver nor spleen could be palpated. There was no enlargement of the heart, but a hæmic bruit and a bruit de galop. The urine had a specific gravity of 1030, and it contained 0·7 parts per thousand of albumin, but no blood and no sugar. There were extensive retinal hæmorrhages, together with older choroiditis and optic atrophy, which may have been syphilitic. The patient's mental symptoms suggested general paralysis of the insane, in which Dr.

Savage, who saw her, also agreed. The blood count and the Prussian blue reaction indicated pernicious anæmia as well, however.

| Date. | Red corpuscles per cent. of normal. | Hæmoglobin. | Colour index. | White corpuscles per cub. mm. |
|----------------|---|-----------------|---------------|----------------------------------|
| 22 March, 1891 | Thoma Ziess. 20 | Fleischl. 20 | 1·0 | Normal |

The post-mortem examination showed:—

Some slight œdema of the feet, ankles, and legs.

A small, firm, but wasted brain.

A heart weighing ten ounces, pale in colour, and soft, with evidence of both fatty degeneration and fatty infiltration; no pericarditis, although during life the bruit de galop had been well marked.

The stomach, intestines, and lungs looked natural.

The liver weighed fifty-seven ounces, and gave a well-marked Prussian blue reaction. For comparison, the livers of two other cases examined post-mortem the same afternoon—one a case of granular kidney, the other one of lobar pneumonia—were tested in precisely the same way, and gave no similar Prussian blue reaction.

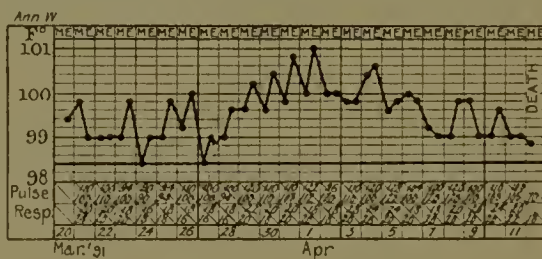
The gall bladder contained two small gallstones.

The spleen weighed four ounces; it was pale, but firm.

The kidneys were pallid, and microscopically exhibited some fatty degeneration of the epithelial cells, but no nephritis and no interstitial fibrosis.

There is no mention of the bone marrow, nor of the Prussian blue reaction in spleen or kidneys.

The temperature chart was as follows:—



CASE 5.—Ref. No., Vol. 123, No. 106.—George B., æt. 57, a provision dealer's shop assistant, was in Clinical Ward from February 25th, 1891, to March 8th, 1891, and he had also been an in-patient in October, 1890, for what was probably part of the same disease. He gave the history that when he was 13 years of age he began to have attacks of pain in the abdomen, accompanied by diarrhœa, these attacks having recurred at intervals, especially in the summer time, when, for two or three weeks at a stretch, he would pass six or seven motions a day. At other times he would be constipated and suffer from "bilious attacks" accompanied by actual vomiting. It was very difficult to say what relation these attacks had to the pernicious anæmia; especially as the man was in the habit of taking too

much alcohol, and also had a stricture. He stated that he had been getting weaker and weaker for five or six years past, but till six months ago his only symptoms were diarrhœa, dyspepsia, and muscular weakness; since then giddiness and a sensation of something pumping inside his head had been added; and he has been getting very pale, and so weak that he could not exert himself physically at all. If he tried to do anything, moreover, he became extremely short of breath. He was "an averagely plump man," weighing $10\frac{1}{2}$ st., but very pale, or rather primrose yellow. The urine was often dark; it contained neither albumin nor blood. There was no œdema of the legs. There was a blowing systolic bruit, deemed to be hæmic, audible at the impulse, but not in the pulmonary area. No bruit de diable was heard. The cardiac impulse was in its normal position. The tongue and mouth were clean, but pallid. Neither spleen nor liver was palpable. Retinal hæmorrhages had been observed in 1890. The temperature was seldom over 99° F. He was discharged for rudeness to the nursing staff, and he has not been traced since. Only one blood count had been made; it showed:—

| Date. | Red corpuscles, per cub. mm. | Red corpus- cles, per cent. of normal. | Hæmoglobin, per cent. of normal. | Colour index. | Leucocytes per cub. mm. |
|----------------|---------------------------------|--|--|---------------|-------------------------------|
| February, 1891 | 1 400,000 | 34 | 35 | 1.029 | — |

No temperature chart is available in this case.

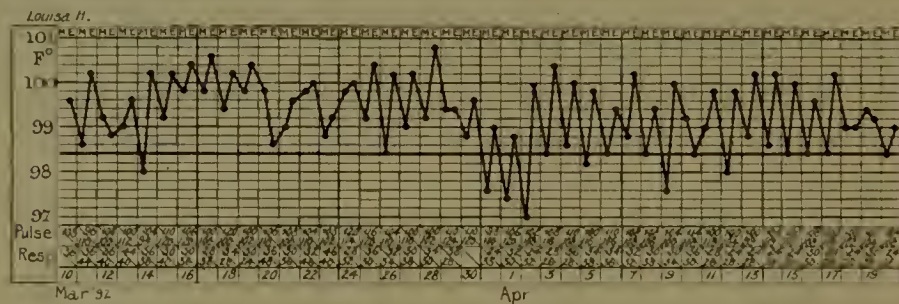
CASE 6.—Ref. No., Vol. 126, No. 155.—Louisa H., æt. 41, a married woman, was in the hospital under the care of Dr. Goodhart from March 8th, 1892, to April 20th, 1892, and went out for family reasons, although she was in an almost dying condition at the time. Her actual fate is not known. Her illness began a month before her admission with loss of appetite, languor, shortness of breath, and general weakness, all of which symptoms came on gradually, but steadily increased. She had had no vomiting and no diarrhœa. When she got about there was some œdema of her ankles and legs. She was a stout woman, and had a very pale yellow colour. Her liver extended three inches and the spleen two inches below the costal margin. The urine was dark coloured, but contained no albumin, blood or sugar. Urobilin was not mentioned. The lungs were natural, and the heart was of normal size, but presented systolic hæmic bruits both at the impulse and in the pulmonary and the aortic areas. The optic discs were normal. The patient's temperature was normal in the morning, but rose to about 100 or 100.6° F. every night throughout her stay in the hospital. The pulse rate varied from 92 to 120, and the respiration rate from 20 to 44. Ascites developed, apparently as the result of a "simple" peritonitis, measurements at the level of the umbilicus being as follows:—

| | | | |
|----------------|-----------------------------|----------------|----------------|
| March 14th ... | ... $39\frac{1}{2}$ inches. | March 19th ... | ... 42 inches. |
| " 17th ... | ... $41\frac{1}{2}$ " | " 21st ... | ... 42 " |
| April 4th ... | ... 45 inches. | | |

Although more than one blood count was made in this case, the only one of which there is a record is the following:—

| Date. | Red corpuscles, per cub. mm. | Red corpus- cles, per cent. of normal. | Hæmoglobin, per cent. of normal. | Colour index. | Leucocytes per cub. mm. |
|----------------|---------------------------------|--|--|---------------|-------------------------------|
| 12 March, 1902 | 800,000 | 16 | 18 | 1.125 | — |

The temperature chart was as follows:—



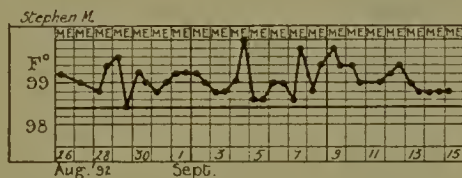
CASE 7.—Ref. No., Vol. 127, No. 158.—Stephen M., æt. 44, a cooper. was in Guy's Hospital from August 25th to September 22nd, 1892. A letter, dated August, 1907, from 14, Horne Gardens, Dartford, states that "Mr. Stephen M. died on February 11th, 1901." He gave the history that at 19 he suffered from severe diarrhœa for some weeks, and his doctors were in much doubt as to whether he had not had typhoid fever. Since then, as he himself expressed it, "every little thing seemed to cause diarrhœa." For some years he had also been subject to severe neuralgia. For three or four years before admission, in 1892, he had been much subject to what he termed "bilious attacks," in which he retched more than he vomited. He had also latterly noticed himself gradually losing colour and strength. He had had an exceptionally severe bilious attack, which laid him in bed for twelve weeks during January, February, and March, 1892. After this he returned to work, but he gradually became so weak that he could not continue. His friends described him as "jaundiced," remarking upon his yellow colour, but neither the conjunctivæ nor the urine exhibited bile pigment. The body was in a condition of general flabby fatness rather than of wasting. There was some tenderness over the long bones, such as the tibiæ and humeri. The tongue was clean, but the teeth were in a bad state. The spleen could not be felt. The liver could be palpated just below the ribs. The heart was not enlarged, but it presented systolic bruits at the impulse and in the pulmonary area, in addition to a bruit de diable in the neck. The lungs presented no abnormal physical signs. There was much pain in the right flank and in the back. Perhaps this was due to the same cause as the tenderness in the long bones, namely, changes in the bone marrow. The urine contained both indican and urobilin, but no albumin, except upon a single occasion. There were no hæmorrhages; the optic discs were normal; the pulse rate averaged 82; the

temperature rose to 99° F. or 100° F. every night. The blood counts were as follows :—

| Date. | Red corpuscles, per cub. mm. | Red corpus- cles, per cent. of normal. | Hæmoglobin, per cent. of normal. | Colour index. | Leucocytes per cub. mm. |
|--------------------|---------------------------------|--|--|---------------|-------------------------------|
| | Thoma Leitz. | | Haldane. | | |
| 27 August, 1892... | 2,750,000 | 55 | — | — | — |
| 3 Sept., " | 2,200,000 | 44 | 40 | 0.909 | — |
| 8 " " | 2,560,000 | 51 | 50 | 0.980 | — |
| 12 " " | 2,650,000 | 53 | 48 | 0.906 | — |
| 16 " " | 2,400,000 | 48 | 56 | 1.166 | — |
| 20 " " | 2,500,000 | 50 | 50 | 1.000 | — |

Note.—Poikilocytosis. Nucleated red corpuscles were present, and there were many megalocytes and microcytes.

The temperature chart was as follows :—



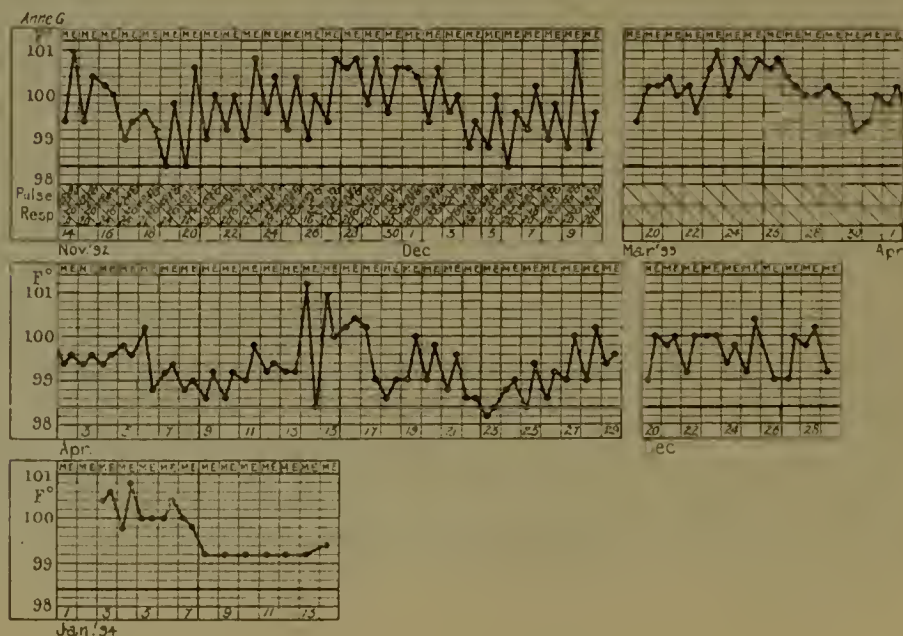
CASE 8.—Ref. Nos., Vol. 125, No. 121, and Vol. 136, No. 27.—Anne G., æt. 51, was admitted under Dr. Taylor on November 14th, 1892, to be discharged relieved on December 10th, 1892. She relapsed and was re-admitted under Dr. Hale White on March 18th, 1893, to be discharged relieved on May 3rd, 1893, relapsing again and being re-admitted December 19th, 1893, and re-discharged on January 24th, 1894. The husband reported, upon inquiry, that she died of her complaint on August 26th, 1894. It is noteworthy that although each time she was discharged she felt better than when she was admitted, the blood condition itself showed comparatively little improvement throughout the time she was under observation. She was a married woman whose menopause had occurred when she was 47, since which time she complained of having become progressively weaker. Exactly when her illness began she could not say, but the history was an indefinite and long one as follows :—At twenty-five years of age, when she was in Constantinople, she had a severe attack of abdominal pains and diarrhœa, which was diagnosed as “cholera,” since which attack she had been regularly subject to “Summer diarrhœa, alternating with constipation, bilious attacks, and headaches.” She had also suffered from attacks of what she termed “low fever,” lasting from seven to fourteen days at a stretch. Since her menopause in 1888 she had been languid and unfit for exertion, and short of breath after doing anything. She was of the typical lemon yellow colour, did not complain of loss of weight, and was fairly well nourished. The heart was of normal size, but there was a systolic hæmic bruit at the impulse and in the pulmonary and aortic areas. There was also a venous hum in the neck. The lungs were natural. The urine was of a light red colour; it contained a trace of albumin most of the time she was in hospital, very

little indican, and sometimes no urobilin, sometimes plenty. The nervous system was natural as regards its reflexes, but there was great muscular weakness in the legs and arms. There were upon occasions purpuric spots upon the abdomen, chest and legs, but no retinal hæmorrhages, and no visceral bleedings. The spleen was enlarged and very firm, coming well below the ribs. The liver could just be felt. The temperature chart was a typical one, reaching 100°F. to 101°F. every evening, falling to 97°F. every morning. Arsenical treatment was adopted, and it is noteworthy that on April 17th, 1893, she developed an extensive eruption of supra-orbital herpes. The blood counts were as follows:—

| Date. | Red corpuscles, per cub. mm. | Red corpus- cles, per cent. of normal. | Hæmoglobin, per cent. of normal. | Colour index. | Leucocytes per cub. mm. |
|-------------------|---------------------------------|--|--|---------------|-------------------------------|
| 21 Nov., 1892 ... | 1,050,000 | 21 | 14 | 0.666 | — |
| 24 " " | 1,050,000 | 21 | 18 | 0.857 | — |
| 7 Dec., " | 1,050,000 | 21 | 25 | 1.190 | — |
| 18 March, 1893... | 750,000 | 15 | 19 | 1.266 | — |
| 21 " " | 750,000 | 15 | 19 | 1.266 | — |
| 25 " " | 850,000 | 17 | 20 | 1.177 | — |
| 29 " " | 950,000 | 19 | 17 | 0.894 | — |
| 4 April, " | 1,050,000 | 21 | 25 | 1.190 | — |
| 10 " " | 1,300,000 | 26 | 30 | 1.154 | — |
| 17 " " | 1,280,000 | 25 | 28 | 1.120 | — |
| 27 " " | 1,500,000 | 30 | 30 | 1.000 | — |
| 3 May, " | 1,450,000 | 29 | 33 | 1.139 | — |
| 21 Dec., 1893 ... | 850,000 | 17 | 20 | 1.177 | — |

Note.—Films repeatedly showed large numbers of poikilocytes, microcytes, and megalocytes. There was no remarkable number of nucleated red corpuscles.

The temperature chart was as follows:—

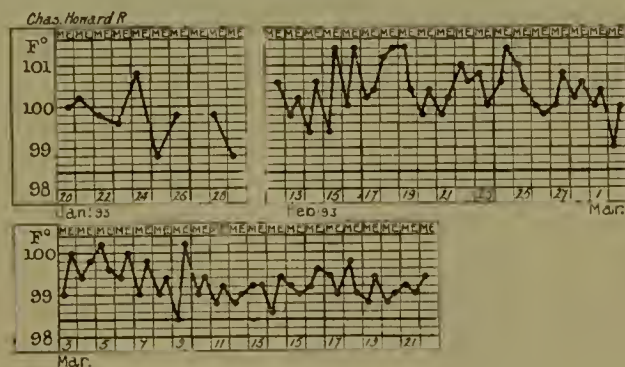


CASE 9.—Ref. No., Vol. 129, No. 130.—Charles R., æt. 22, a clerk, was in the hospital, under Dr. Pye-Smith, from January 20th, 1893, to the 22nd March, 1893, and he died two weeks after his discharge. He was described as being "the drunken son of a drunken father." He came in for paralysis of his legs, all the muscles in them exhibiting the reaction of degeneration. His condition was one of extreme peripheral neuritis due to alcoholism, and at the same time there was an extreme degree of anæmia of the typical pernicious type. It was stated that the trouble began two months before admission, with cramp in the legs and numbness. There had been no gastric symptoms and no diarrhœa. The teeth were in excellent condition. Neither the liver nor the spleen could be felt. The heart was of normal size, but exhibited hæmic systolic bruits at the impulse, in the pulmonary and aortic areas, and in the veins in the neck. The urine was of a dark colour, and it precipitated uric acid crystals; it was doubtful whether it contained urobilin. There were retinal hæmorrhages in both eyes. The pulse rate was usually about 100, and the temperature reached 101° F. each evening during the first three weeks of the patient's stay, and during the latter part of his stay reached from 99 to 100° F. each night. The patient's general colour was of a typical lemon yellow of pernicious anæmia. The blood counts were as follows:—

| Date. | Red corpuscles, per cub. mm. | Red corpus- cles, per cent. of normal. | Hæmoglobin, per cent. of normal. | Colour index. | Leucocytes per cub. mm. |
|-------------------|---------------------------------|--|--|---------------|-------------------------------|
| 18 February, 1893 | 600,000 | 12 | 12 | 1·000 | — |
| 24 " " | 700,000 | 14 | 20 | 1·428 | — |
| 7 March " | 1,500,000 | 30 | 30 | 1·000 | — |

Note.—On March 7th, 1893, the alkalinity of the blood was equal to 150 mgrm., KOH. (Hunter).

The temperature chart was as follows:—



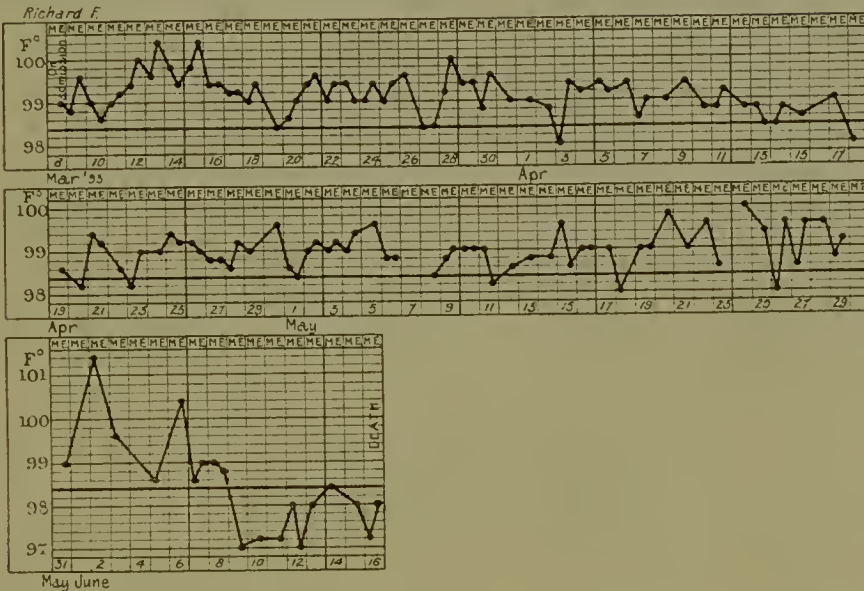
CASE 10.—Ref. No., Vol. 132, No. 158, and Post-mortem No. 224, 1893. (See Museum Specimen No. 133.)—Richard F., æt. 55, a fish dealer, was admitted under Dr. Hale White on March 8th, 1893, for anæmia, shortness of breath, and weakness, and died on June 17th, 1893. Briefly, he was a syphilitic drunkard, who had none the less been in what he termed good health until about eight weeks before his admission; he then first noticed a languor in his legs on going upstairs, and there had been a rapid and

progressive increase in this loss of strength. There had been no vomiting and no diarrhœa. He became too weak to be out of bed. There was loss of weight down to 8st. 9lbs., but much less loss of bulk. On admission he presented the typical lemon colour with a reddish flush over each malar bone. There were hæmic bruits all over the precordial area, loudest at the impulse. The teeth were in excellent condition, only two were missing. The liver could be felt, firm, but smooth, three-quarters of an inch below the ribs. The spleen was not felt. There were retinal hæmorrhages in each eye. The knee-jerks were absent, though the pupils reacted normally. The urine had a specific gravity of 1012, it contained neither albumin nor blood, but both indican and urobilin were abundant on occasions. The alkalinity of the blood was normal. Arsenic was ill-tolerated in that it caused incessant diarrhœa. Towards the end the patient was very drowsy, with Cheyne-Stokes respiration for several days. The liver enlarged rapidly so as to reach almost to the umbilicus, pericarditis developed, and the patient died comatose. At the autopsy the marrow of the tibiæ was deep red; the brain exhibited several ochreous depressed patches in the cortex, apparently the result of former hæmorrhages; none of these patches were very large, but they were quite numerous; the arteries were healthy; there were fifteen ounces of clear serous fluid in either pleural cavity, the lungs and pleuræ being healthy; the heart exhibited marked tabby-cat striation, and acute plastic pericarditis; the alimentary canal seemed natural; the liver was firm and pale, and it gave a very marked iron reaction both with the potassium ferrocyanide and with the ammonium sulphide tests; the kidneys together weighed thirteen and a half ounces, they were pale, and gave a marked ferrocyanide reaction in streaks; the spleen weighed ten ounces, and it gave a slight ferrocyanide reaction; the pancreas was tough to an unusual degree. The temperature chart and the blood counts are appended; it will be noticed the temperature was slightly but constantly raised each evening to something between 99°F. and 100·4°F.

| Date. | Red corpuscles, per cub. mm. | Red corpus- cles, per cent. of normal. | Hæmoglobin, per cent. of normal. | Colour index. | Leucocytes per cub. mm. |
|---------------|---------------------------------|--|--|---------------|-------------------------------|
| | Inoma Zeiss. | | Gowers. | | Inoma Zeiss |
| 8 March, 1893 | 1,200,000 | 24 | 18 | 0·750 | No leuco- cytosis |
| 10 " " | 1,000,000 | 20 | 16 | 0·800 | |
| 14 " " | 1,050,000 | 21 | 15 | 0·714 | — |
| 17 " " | 1,000,000 | 20 | 20 | 1·000 | — |
| 21 " " | 1,550,000 | 31 | 30 | 0·968 | — |
| 25 " " | 1,350,000 | 27 | 25 | 0·926 | — |
| 29 " " | 1,200,000 | 24 | 27 | 1·125 | — |
| 3 April | 600,000 | 12 | 10 | 0·833 | — |
| 5 " " | 750,000 | 15 | 20 | 1·333 | — |
| 7 " " | 750,000 | 15 | 22 | 1·466 | — |
| 11 " " | 600,000 | 12 | 24 | 2·000 | — |
| 14 " " | 1,500,000 | 30 | 22 | 0·733 | — |
| 18 " " | 1,500,000 | 30 | 25 | 0·833 | — |
| 2 May | 2,250,000 | 45 | 30 | 0·666 | — |
| 6 " " | 1,800,000 | 36 | 30 | 0·833 | — |
| 9 " " | 2,250,000 | 45 | 32 | 0·711 | — |
| 13 " " | 2,250,000 | 45 | 40 | 0·888 | — |
| 17 " " | 1,900,000 | 38 | 40 | 1·053 | — |
| 22 " " | 1,000,000 | 20 | 20 | 1·000 | — |
| 26 " " | 2,000,000 | 40 | 35 | 0·875 | — |
| 30 " " | 2,000,000 | 40 | 32 | 0·800 | — |
| 5 June | 1,750,000 | 35 | 20 | 0·571 | — |

Note.—Poikilocytes, megalocytes, and microcytes abundant. Nucleated red cells not strikingly abundant.

The temperature chart was as follows :—



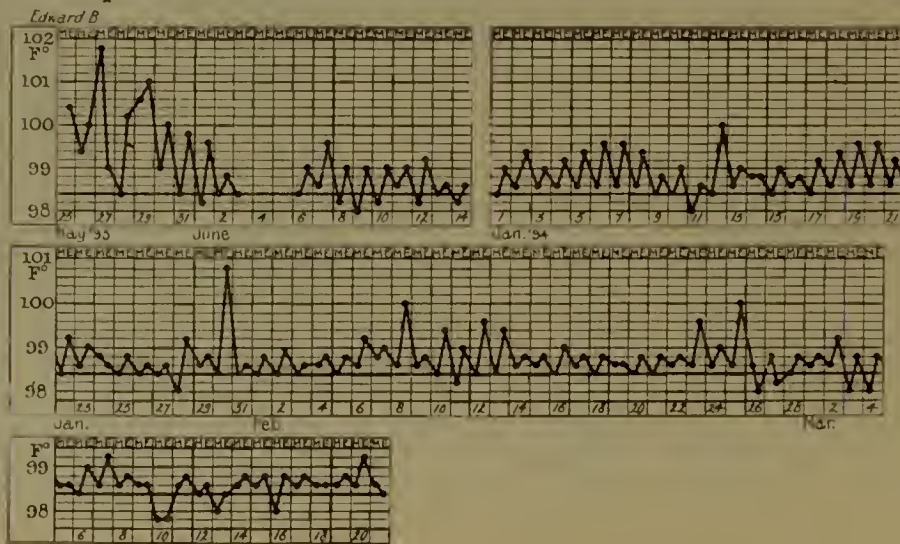
CASE 11.—Ref. No., Vol. 135, No. 6; Post-mortem No. 226, 1894.—Edward B., æt. 56, was admitted, under Dr. Goodhart, on May 24th, 1893, became relieved, and was discharged on July 22nd, 1893; he relapsed soon after, was readmitted on November 20th, 1893, and died on June 9th, 1894. He gave the history that he was quite well until five years before his first admission, and that he then suffered from a bad attack of diarrhœa during the summer, losing much blood per rectum at the time; each summer since then he had had a precisely similar and very severe attack. In March, 1892, he first thought he was “jaundiced,” and told his doctor so. In July, 1892, he was so much worse that he was laid up in Croydon Hospital for twenty-two weeks. After that he worked for eight weeks, but became progressively weaker and more ill. He had suffered from pains in the chest and abdomen and from giddiness for over two years. These, together with prostrating weakness, were his main symptoms on admission. He was the typical colour. There had only been slight loss of weight. He was 11st. 11lb. on admission. His temperature was always at least 99° F. at night, often it was 100° F., and sometimes 101° F. There were well-marked retinal hæmorrhages and hæmic bruits. There had been œdema of the ankles, but this was gone when he lay in bed. Appetite was poor, but there was no vomiting. The fæces were small and very hard globular masses, looking “like iron rust.” The spleen was not felt now, but it was ultimately quite large. The liver was felt down to the umbilicus or lower. The urine had a specific gravity of 1010, and it was constantly pale; it deposited uric acid crystals; it contained neither albumin (except once) nor blood, and urobilin was absent to the ordinary spectroscopic test. There were subcutaneous petechiæ upon the arms and diffuse purpuric blotches on the legs. Epistaxis also occurred spontaneously more than once. After the administration of arsenic there were one or two severe diarrhœic attacks. Itching of the skin was at one period

a very troublesome symptom, though jaundice was entirely absent. During the final relapse the patient became œdematous, and serous exudations occurred. Finally, there was increased pyrexia, with rigors, due to a terminal infective endocarditis, which was the immediate cause of death. The post-mortem examination showed: A well-nourished body, profoundly anæmic, with yellow fat, and some œdema of the nether limbs. Each pleural cavity contained three pints of serous fluid; the pericardium contained eighteen ounces of similar fluid, and the peritoneum forty-one ounces. The lungs were very pale and extremely œdematous. The alimentary canal looked natural. The heart was pallid, the mitral and pulmonary valves were œdematous, the former being incompetent and the latter bearing acute granulations near its free edge. The spleen weighed nineteen ounces, and was dark and tough, the kidneys weighed thirteen ounces, and the liver eighty ounces; liver, spleen and kidneys all contained a large excess of iron, and gave a well-marked Prussian blue reaction. The blood counts made during life were as follows:—

| Date. | Red corpuscles, per cub. mm. | Red corpus- cles, per cent. of normal. | Hæmoglobin, per cent. of normal. | Colour index. | Leucocytes per cub. mm. |
|------------------|---------------------------------|--|--|---------------|-------------------------------|
| | Thoma Zeiss. | | ? Method. | | |
| 24 May, 1893 | 800,000 | 16 | 30 | 1.875 | No leuco- cytosis |
| 5 June " | 1,250,000 | 25 | 35 | 1.400 | — |
| 20 " " | 2,100,000 | 42 | 50 | 1.190 | — |
| 7 July " | 1,850,000 | 37 | 45 | 1.216 | — |
| 21 " " | 2,750,000 | 55 | 60 | 1.091 | — |
| 15 January, 1894 | 500,000 | 10 | 18 | 1.800 | — |
| 28 " " | 1,150,000 | 23 | — | — | — |
| 6 February " | 900,000 | 18 | 20 | 1.111 | — |
| 7 March " | 1,000,000 | 20 | 20 | 1.000 | — |
| 22 " " | 900,000 | 18 | 18 | 1.000 | — |
| 10 April " | 1,250,000 | 25 | 20 | 0.800 | — |
| 4 May " | 1,600,000 | 32 | 15 | 0.469 | — |
| 29 " " | 2,000,000 | 40 | 30 | 0.750 | — |
| 8 June " | 1,850,000 | 37 | 19 | 0.514 | — |

Note.—The red cells in film were typical of pernicious anæmia.

The temperature chart was as follows:—



CASE 12.—Ref. No., Vol. 130, No. 143.—John F., æt. 52, a curator of a Miners' Institute in Durham, was admitted for "general debility and anæmia" under Dr. Taylor on September 14th, 1893, and was discharged relieved on October 3rd, 1893. He had always enjoyed good health until four years previously, when he began to suffer from giddiness, occipital headaches, and impaired appetite; and he noticed that he very readily became fatigued. These symptoms increased slowly but progressively. Two years before admission he had "coughed up" eight ounces of blood, but there had been no further pulmonary symptoms. On admission he was a fairly typical case of pernicious anæmia. Neither liver nor spleen could be felt. The lemon yellow colour of skin was distinctive. The heart sounds were normal. The urine had a specific gravity of 1020; there was neither albuminuria nor hæmaturia. Arsenical treatment afforded some relief; but Alice F. writes on August 15th, 1907: "John F., after leaving Guy's Hospital, was in greatly improved health, and his friends all noticed a great change; but the following winter he contracted a severe attack of influenza, which again brought on the old complaint. . . . He died on July 25th, 1894." The blood count was as follows:—

| Date. | Red corpuscles, per cub. mm. | Red corpus- cles, per cent. of normal. | Hæmoglobin, per cent. of normal. | Colour index. | Leucocytes per cub. mm. |
|--------------------|---------------------------------|--|--|------------------|-------------------------------|
| 20 Sept., 1898 ... | Thoma Zeiss. 1,500,000 | 30 | 50 | Gowers. 1.666 | — |

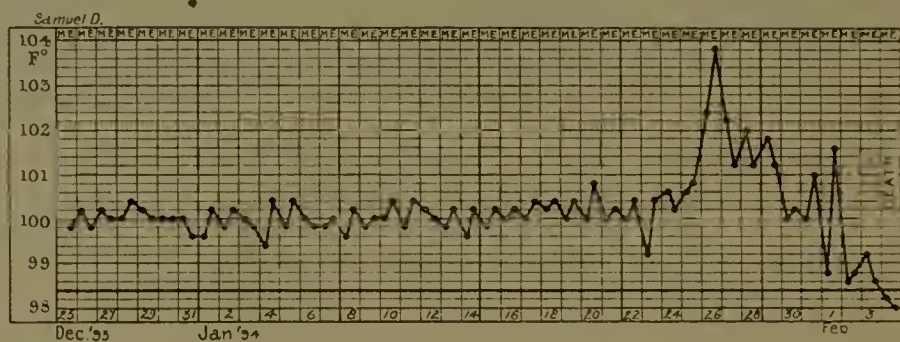
No temperature chart is available in this case.

CASE 13.—Ref. Nos., Vol. 136, No. 15; Post-mortem No. 62, 1894.—Samuel D., æt. 45, was admitted under Dr. Hale White on December 23rd, 1893, and died on February 9th, 1894. He gave a history of having been dangerously ill six years previously with symptoms which were diagnosed as "cholera," though he had never been abroad. He recovered after some while, and enjoyed fair health for five years. He then began to get progressively weaker, to lose his appetite, to suffer from very troublesome diarrhœa, and from breathlessness on ordinary exertion. He had been continuously under medical treatment from August, 1893. His height was 5ft. 5ins., and his weight 8st. His skin had the lemon colour of pernicious anæmia. There were hæmic bruits in the mitral, aortic and pulmonary areas, and in the neck. Neither liver nor spleen could be felt. The urine was dark, and contained both indican and urobilin, but neither albumin, blood, nor sugar. The optic discs and retinae were at first natural, but later they developed hæmorrhages. Much diarrhœa interfered with arsenical treatment. There was a very slight improvement for a time, then a relapse, and the patient lay semi-comatose for some days before he died. There was no œdema. The lymphatic glands were not obviously abnormal. The lungs and pleuræ were natural, except for old adhesions over the latter, and petechial hæmorrhages both under the pleura and within the lungs. The heart weighed twelve ounces; the valves were natural, but the muscle exhibited some degree of tabby-cat striation. The stomach and intestines all looked quite natural; there were not even any enlarged follicles in the colon. The liver was pale brown and gave a moderately good Prussian blue reaction with

the potassium ferroeyanide test. The spleen weighed seven ounces; it was firm and dark. The kidneys together weighed nine ounces; they were anæmic, but otherwise seemed healthy. The blood counts were as follows:—

| Date. | Red corpuscles, per cub. mm. | Red corpus- cles, per cent. of normal. | Hæmoglobin, per cent. of normal. | Colour index. | Leucocytes per cub. mm. |
|-------------------|---------------------------------|--|--|---------------|-------------------------------|
| | Thoma Zeiss. | | Gowers. | | |
| 24 Dec., 1893 ... | 1,000,000 | 20 | 17 | 0·850 | — |
| 1 January, 1894 | 1,200,000 | 24 | 20 | 0·833 | — |
| 19 " " | 1,150,000 | 29 | 24 | 0·827 | — |
| 26 " " | 850,000 | 17 | 25 | 1·470 | — |

The temperature chart was as follows:—



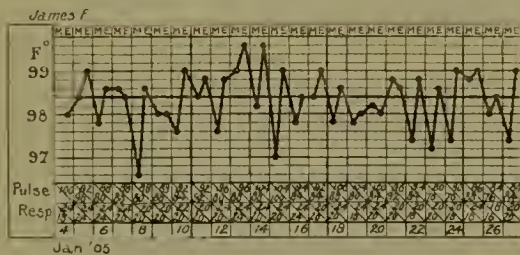
CASE 14.—Ref. Nos., Vol. 136, No. 352, and Vol. 194, No. 26.—James F., æt. 60, an Army pensioner, was admitted for diarrhœa, weakness, and tingling in fingers and toes, under Dr. Hale White, on January 4th, 1905, and he was discharged relieved on January 28th, 1905. He had been in Guy's Hospital in 1894 for very much the same symptoms, and at that time he had been ill for seven months with loss of appetite and strength, and the frequent passage of small quantities of blood per rectum. At that time he was very anæmic indeed, the red corpuscles numbering only 30 per cent. of the normal, but neurotic dyspepsia was diagnosed, and the anæmia was attributed to the loss of blood per rectum. A very thorough rectal examination was made under an anæsthetic, but the source of bleeding could not be found; colitis was suspected, but not actually diagnosed. Treatment was by means of iron and arsenic together, and the patient was discharged, greatly improved in health, though weighing only 8st. 9lbs. He maintained his improved health for *over ten years*, and by November, 1904, he weighed 13st. 7lbs. He now began to feel ill again, with loss of appetite, weakness, and diarrhœa. The latter occurred to the extent of fifty motions a week at one period, though at the time of readmission there were only two or three motions a day. There was no vomiting, and there was now no blood loss in the stools. A fortnight before he was admitted his old tingling of fingers and toes began to trouble him again. He was extremely yellow, but not jaundiced, with plenty of subcutaneous fat and a flush over each malar bone. The lungs were natural. The heart was of normal size, but presented a hæmic bruit. The teeth were good, and the mouth clean and sweet. The spleen was not felt. The liver could be palpated one inch below the ribs. The

reflexes were natural, but there were sensory disturbances in the form of acroparæsthesia. The urine was acid, and of specific gravity 1014; it contained neither pus, blood, nor albumin; urobilin is not mentioned. The chart shows a very slight but repeated rise each evening. The pulse rate varied from 76 to 100, and the respiration rate from 18 to 24. The subsequent history of the case is given by his daughter, as follows (August 14th, 1907):—"Dear Sir,—With reference to your letter. . . I think you already know my father's illness in 1895 was succeeded by a second of exactly similar nature in 1905, and that on both occasions he was an in-patient at Guy's. He left hospital in January, 1905, and for three or four months maintained fair health, though less strong than he had been. About May, 1905, he showed signs of increasing weakness, loss of appetite, and frequently complained of deadness in his finger tips. He was able to keep about till the end of June, 1905, when he died very suddenly, death being due to an apoplexy of the brain. This last illness extended little over twenty-four hours, during which he was unconscious. . . ." The blood counts were as follows:—

| Date. | Red corpuscles, per cub. mm. | Red corpus- cles, per cent. of normal. | Hæmoglobin, per cent. of normal. | Colour index. | Leucocytes per cub. mm. |
|--------------------|---------------------------------|--|--|---------------|-------------------------------|
| 5 January, 1905 | Thoma Leitz. 2,500,000 | 50 | Haldane. 53 | 1.060 | — |
| 18 " " | 2,000,000 | 40 | 46 | 1.150 | 8,500 |
| 25 " " | 3,370,000 | 67 | 56 | 0.836 | — |

Note.—Films showed many poikilocytes and megalocytes.

The temperature chart was as follows:—

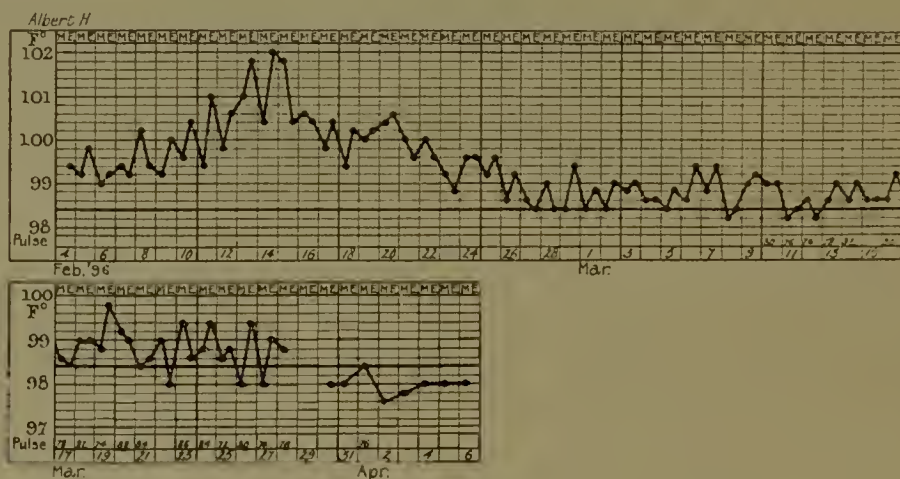


CASE 15.—Ref. No., Vol. 146, No. 65.—Albert H., æt. 26, an ex-soldier, was admitted to the hospital, under Dr. Goodhart, on February 3rd, 1896, and was discharged relieved on April 6th, 1896; after that he could not be traced. He came in for general weakness and shortness of breath on exertion, and gave the history that he was perfectly well until he was stationed at Aden, in 1890. There he felt ill and weak and unable to work, so he returned to India on sick leave. He thought he had had no fever until 1893. He returned to England in February, 1895, being invalided to Netley. His health improved, and he was discharged much better. In August, 1895, he began to get weak again, listless, and disinclined to work. He lost his appetite, and his doctor kept him in bed for six weeks, and his health was much improved again by October, 1895. He tried to work in the Arsenal, at Woolwich, but he got weaker again, and short of breath on walking. By the day of his admission he was so weak that it was a misery for him to go out

of doors. He was a tall man, profoundly anæmic, not wasted apparently, but thinner than he had been. The heart was of normal size, but it exhibited hæmic systolic bruits at the impulse and in the pulmonary area. The lungs were natural. The tongue was clean, and the teeth were noted as being exceptionally good. The bowels were open regularly. Neither liver nor spleen could be felt. There was no vomiting. The urine was a light colour, having a specific gravity of 1020, and it contained no albumin nor any blood. It occasionally exhibited urobilin to the spectroscopic test. There were no retinal hæmorrhages. Sensation was normal. The knee jerks were absent. There was a general brown pigmentation of the skin, but none of the mucous membranes. Treatment was by means of arsenic. Previous to the patient's discharge the spleen could be felt below the costal margin. The temperature was sometimes as high as 102° F., and always at least 99° F., at night, and often between 99° and 100° F. The patient's weight was 10st. 5lbs., with clothes. The blood counts were as follows:—

| Date. | Red corpuscles, per cub. mm. | Red corpus- cles, per cent. of normal. | Hæmoglobin, per cent. of normal. | Colour index. | Leucocytes per cub. mm. |
|------------------|---------------------------------|--|--|---------------|-------------------------------|
| 4 February, 1893 | 650,000 | 13 | 30 | 2.308 | — |
| 22 " " | 600,000 | 12 | 20 | 1.666 | — |
| 3 March, " | 1,000,000 | 20 | 27 | 1.350 | — |
| 7 " " | 1,650,000 | 33 | 28 | 0.849 | — |
| 14 " " | 3,100,000 | 62 | 33 | 0.532 | — |
| 21 " " | 2,950,000 | 59 | 37 | 0.627 | — |
| 28 " " | 3,600,000 | 72 | 52 | 0.722 | — |
| 7 April " | 3,500,000 | 70 | 75 | 1.071 | — |

The temperature chart was as follows:—



CASE 16.—Ref. No., Vol. 148, No. 345.—Henry N., æt. 61, an engineer's assistant, was admitted under Dr. Hale White on 15th September, 1896, and was discharged, relieved to some extent, on October 27th, 1896. He remembered no illness until three years previously, when he found he began to get very easily tired. This physical weakness increased slowly, but persistently, until he was unable to ascend even two or three steps. He also experienced

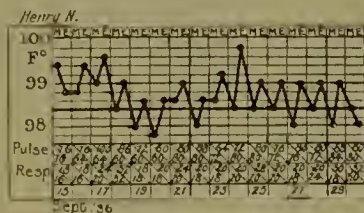
subjective sensory symptoms, which he described as "tearing pains in his chest and abdomen, and feeling as though his body were being tightly gripped and squeezed." The skin was the typical yellow colour. The muscles were flabby, but there had been only slight loss of bulk. The body weight was 9st. 11lbs., without clothes. The ankles were a little œdematous. The pulse rate averaged 60 to 80, the respiration rate 16 to 32, and the temperature was often 99° F. at night, though it never exceeded 99·8° F. There were pigmented scars upon his legs and petechiæ under the skin on the backs of his hands. The heart presented no bruit. The urine had a specific gravity of 1020, and contained neither blood nor albumin, but gave a urobilin band spectroscopically. The spleen was palpable, the liver was not. The patient was edentulous. The nerve reflexes were natural. The patient at no time suffered either from vomiting or from diarrhœa. Arsenical treatment was adopted. Since his discharge he has not been traceable. The blood counts were as follows:—

| Date. | Red corpuscles, per cub. mm. | Red corpus- cles, per cent. of normal. | Hæmoglobin, per cent. of normal. | Colour index. | Leucocytes per cub. mm. |
|----------------|---------------------------------|--|--|---------------|-------------------------------|
| 15 Sept., 1896 | Thoma Zeiss. 575,000 | * | 15 | 1·250 | No leuco- cytosis. |
| 16 " " | 600,000 | 12 | 15 | 1·250 | |
| 22 " " | 850,000 | 17 | 25 | 1·470 | |
| 29 " " | 1,500,000 | 30 | 25 | 0·833 | |
| 2 Oct. " | 1,350,000 | 27 | 25 | 0·926 | |

Note.—Megalocytes and poikilocytes were numerous.

* The figures in the report are double; as indicated by the figures for October 2nd in the original, the calculations had been erroneous.

The temperature chart was as follows:—



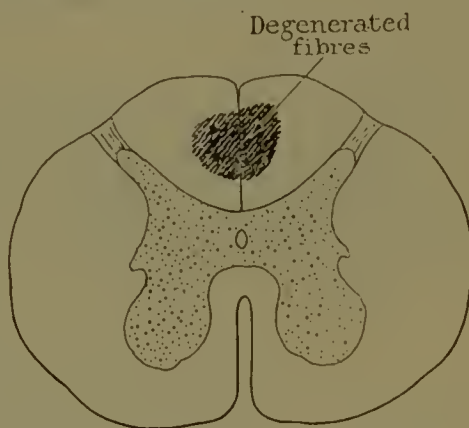
CASE 17.—Ref. No., Vol. 145, No. 306; Post-mortem No. 448, 1896.—Caroline L., æt. 50, was admitted on October 23rd, 1896, under the care of Dr. Perry, and she died on November 2nd, 1896. She was a married woman who "had never been strong." In 1889 she had had a bad attack of "English cholera," and since then she had been continuously weak, liable to sweating attacks both by day and by night, and she had had to be extremely careful with her eating, or else she suffered from abdominal attacks associated with diarrhœa. On July 20th, 1896, she was suddenly attacked with acute vomiting, since when she had often been actively sick eight and ten times a day. She had lost flesh slightly, and she had become very giddy. She was a fairly well-nourished person, very anæmic, with typical pale yellow skin and white conjunctivæ. The heart presented hæmic bruits in all areas,

but particularly at the impulse. Her throat felt "parehed," and the tongue was sore. There were streaks of blood with the motions. The liver was palpable just below the rib margin, and there was a sense of resistance over the splenic area, though the spleen was not actually felt. There were rhonchi audible over both lungs. The temperature was at first up to 105·6°F., later it reached 100°F. or 101°F. almost every evening, and the pulse rate lay between 96 and 120, and the respiration rate between 20 and 36. The urine was high coloured, and it contained a trace of albumin, but no blood. Urobilin, indican, and renal tube casts are not mentioned. There were no obvious retinal hæmorrhages. The nervous system did not seem abnormal clinically, though changes in the posterior columns were found post-mortem. The patient died of progressive weakness and exhaustion. The blood count showed no high colour index; but the post-mortem findings were pathognomonic.

| Date. | Red corpuscles, per cub. mm. | Red corpuscles, per cent. of normal. | Hæmoglobin, per cent. of normal. | Colour index | Leucocytes per cub. mm. |
|------------------|---------------------------------|---|--|--------------|-------------------------------|
| 27 October, 1896 | Thoma Zeiss. 1,200,000 | 25 | Fleischl. 15 | 0·600 | No leucocytes. |

Note.—Poikilocytes very numerous.

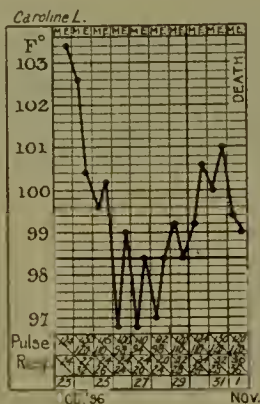
The body was fairly well nourished, but extremely pallid—pale yellow. The brain weighed fifty-one ounces, and appeared normal macroscopically. The pia-arachnoid over the cervical and upper dorsal region of the spinal cord was curiously pigmented, of a dark grey colour; and there was also definite degeneration in the posterior columns:—



The spinal degeneration was confirmed microscopally.

The lungs were pale and œdematous; there were a few pleural adhesions, but no active pleurisy. The heart weighed ten ounces. Its valves and pericardium were normal, but the muscle exhibited well-marked tabby-cat striation. The alimentary canal exhibited neither gastritis nor enterocolitis. There was no ascites. The liver weighed fifty-one ounces, was of the typical café-au-lait colour, and gave a deep Prussian-blue reaction to Perl's test. The spleen was large and pulpy, weighing fourteen ounces. The kidneys together weighed ten ounces, and they gave a considerable iron reaction also. The bone marrow was not mentioned.

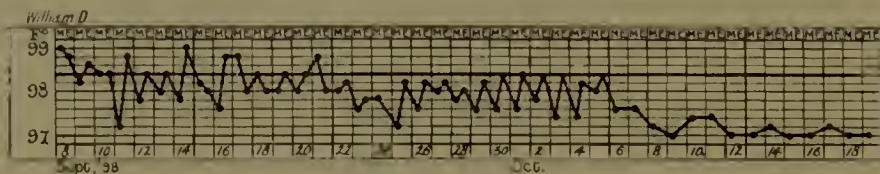
The temperature chart was as follows :—



CASE 18.—Ref. No., Vol. 155, No. 242.—William D., æt. 66, a carpenter, was admitted under Dr. Taylor on September 7th, 1898, and discharged relieved on October 25th, 1898. He came in for weakness, precordial pain, and anæsthesia of his feet. He had been exceptionally strong and well until six months previous to admission, and then weakness and languor began to creep over him, and he used to suffer from pain over his heart on any exertion, such as that of trying to carpenter. He “could not feel sure of his foothold owing to numbness in his soles, so that he used to stumble like a drunken man sometimes.” Occasionally there was œdema of the ankles when he had been standing, and he was short of breath on doing anything. He had lost weight, but not bulk, and his tissues felt to him soft and flabby. He weighed 130 pounds. The heart dulness extended out to the left nipple line, and there were hæmic bruits both at the apex and at the base and at the root of the neck on either side. The pulse rate was usually about 72. The temperature did not exceed 99° F. The knee-jerks were natural. The urine was very pale, of specific gravity 1008; it contained neither albumin nor blood. The discs and retinæ were natural; neither liver nor spleen could be felt. The teeth were in very fair condition. There was diarrhœa after arsenic had been given, but none before. After rallying he went out, and his wife reports (August, 1907), “Mr. D. has been dead seven years. He was ill for two years after leaving Guy’s and died of heart failure.” The blood counts were as follows:—

| Date. | Red corpuscles, per cub. mm. | Red corpus- cles, per cent. of normal. | Hæmoglobin, per cent. of normal. | Colour index. | Leucocytes per cub. mm. |
|---------------|---------------------------------|--|--|---------------|-------------------------------|
| | Thoma Zeiss. | | Gowers. | | |
| 8 Sept., 1898 | 900,000 | 18 | 32 | 1·777 | — |
| 9 " " | 900,000 | 18 | 28 | 1·555 | — |
| 13 " " | 1,450,000 | 29 | 40 | 1·380 | — |
| 20 " " | 2,000,000 | 40 | 38 | 0·950 | — |
| 24 " " | 1,950,000 | 39 | 40 | 1·026 | — |
| 30 " " | 2,250,000 | 45 | 65 | 1·444 | — |
| 12 October " | 4,500,000 | 90 | 45 | 0·500 | — |
| 16 " " | 4,500,000 | 90 | 45 | 0·500 | — |
| 21 " " | 4,500,000 | 90 | 60 | 0·666 | — |
| 24 " " | 4,500,000 | 90 | 65 | 0·722 | — |

The temperature chart was as follows:—



CASE 19.—Ref. No., Vol. 156, No. 380.—Alice D., age not known, was admitted for weakness, flatulence, and pain over the heart, under the care of Dr. Taylor, on November 5th, 1898, and she was discharged relieved on December 30th, 1898. Attempts to trace her since then have failed. She was a married woman who had always suffered from “indigestion.” Otherwise she had been perfectly well until her first misearriage “some years ago,” when she lost a great deal of blood, and since when she had always been ailing more or less. “Last year” she was in bed for three weeks with giddiness and dyspepsia. She dated the illness for which she was admitted to the middle of August, 1898, when she became so physically weak and languid, and suffered so from the “spasms,” that by doctor’s orders she stayed in bed. Since that time she had suffered from œdema of the feet whenever she got up. She was very anæmic and thin, weighing only 5st. 4lb. Neither liver nor spleen could be felt. A hæmic bruit was audible at the impulse and in both pulmonary and aortic areas. The urine nearly always contained obvious urobilin, but neither albumin nor blood. Improvement under arsenical treatment was rapid for the time being at least, though what has happened to the patient since is unknown. The blood counts were as follows:—

| Date. | Red corpuscles, per cub. mm. | Red corpus- cles, per cent. of normal. | Hæmoglobin, per cent. of normal. | Colour index | Leucocytes per cub. mm. |
|--------------|---------------------------------|--|--|--------------|---------------------------------------|
| 8 Nov., 1898 | Thoma Zeiss. 1,250,000 | 25 | Gowers. 46 | 1·840 | Thoma Zeiss. No leuco- cytosis. |
| 16 " " | 3,600,000 | 72 | 70 | 0·972 | — |
| 18 " " | 2,400,000 | 48 | — | — | — |
| 1 Dec., " | 3,100,000 | 62 | 50 | 0·807 | — |
| 10 " " | 4,000,000 | 80 | 60 | 0·750 | — |
| 20 " " | 3,000,000 | 60 | 65 | 1·083 | — |

No temperature chart is available in this case.

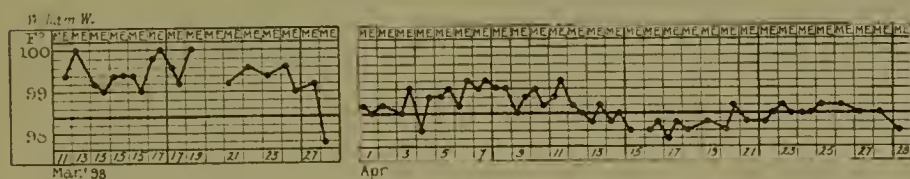
CASE 20.—Ref. No., Vol. 157, No. 105.—William W., æt. 47, a coachman, was admitted under the care of Dr. Washbourn on March 9th, 1898, and was discharged relieved on April 30th, 1898. The symptoms for which he was admitted were weakness, numbness of the hands and feet, and some swelling of the latter. He stated that he had been perfectly well until eight months previously, when he began to experience a feeling of dizziness if he walked at all fast. Next he became troubled by swelling of the feet and ankles, starting in September, 1897; then by buzzing noises in his ears, great weakness, and numbness of his hands and feet. It was stated that he had also noticed blood in his urine, but the latter contained neither blood nor albumin during

his stay in hospital. There was no obvious urobilinuria. Neither spleen nor liver could be felt. The heart was of normal size; it presented a hæmic bruit in the pulmonary area. The optic discs were natural, and there were no retinal hæmorrhages. Arsenical treatment was followed by considerable improvement for the time being, but in reply to inquiries made in August, 1907, it was ascertained that "W. never recovered, but died about a year after he left the hospital." The temperature was at first 100° F. each night, but later, as improvement set in, it seldom exceeded 99° F. The blood counts were as follows:—

| Date. | Red corpuscles, per cub. mm. | Red corpus- cles, per cent. of normal. | Hæmoglobin, per cent. of normal. | Colour index. | Leucocytes per cub. mm. |
|---------------|---------------------------------|--|--|---------------|-------------------------------|
| | Thoma Zeiss. | | Gowers. | | Thoma Zeiss. |
| 9 March, 1898 | 850,000 | 17 | 15 | 0.882 | Normal |
| 11 " " | 900,000 | 18 | 15 | 0.833 | — |
| 19 " " | 1,100,000 | 22 | 20 | 0.909 | — |
| 26 " " | 600,000 | 12 | 14 | 1.166 | — |
| 27 April, " | 3,900,000 | 78 | 40 | 0.513 | — |

Note.—In stained films poikilocytes, megalocytes and microcytes were numerous, and there were a fair number of nucleated red cells.

The temperature chart was as follows:—



CASE 21.—Ref. No., Vol. 165, No. 74.—Annie T., æt. 37, a housewife, was admitted for œdema of the right leg and for a pustular eruption on the left leg, under Dr. Washbourn, on February 15th, 1900, and discharged, considerably relieved, on April 6th, 1900. Efforts to trace her since then have been unsuccessful. She stated that she had been perfectly well until four years previously, when she began to get weak, languid, and short of breath on exertion. She improved under her doctor's treatment. Attention had been called to the yellowness of her skin as long ago as that time. She had been subject to much vomiting, especially in the morning, although she had never been pregnant, and was not an alcoholic subject. There had been no hæmatemesis. Leucorrhœa was a considerable trouble to her. Her condition had been getting worse slowly for a long time. The swelling of her right leg was due to a recent thrombosis. The heart was not enlarged, but there were hæmic bruits in all areas. The teeth were all good. Neither liver nor spleen was felt. The urine was of a deep red-brown colour, and it contained much urobilin; it had a specific gravity of 1018, and was free from albumin and blood. The pulse rate was about 92, respiration rate about 20, and the temperature often 99°, and once over 100° F. The only evidence of abnormality of the nerves was decided exaggeration of the

knee-jerks. The patient's weight was 7st. 2lbs. The blood counts were as follows:—

| Date. | Red corpuscles, per cub. mm. | Red corpus- cles, per cent. of normal. | Hæmoglobin, per cent. of normal. | Colour index. | Leucocytes per cub. mm. |
|-------------------|---------------------------------|--|--|---------------|-------------------------------|
| | Thoma Zeiss. | | | | Thoma Zeiss. |
| 19 February, 1900 | 1,550,000 | 31 | 35 | 1.129 | 6,000 |
| 5 March " | 2,250,000 | 45 | 50 | 1.111 | 2,000 |
| 17 " " | 3,300,000 | 66 | 65 | 0.985 | 2,000 |

Note.—Films showed many poikilocytes, megalocytes, normoblasts, and megoblasts. The differential leucocyte count on one occasion was as follows: *—S. 30, L. 8, P. 60, E. 5; on another it was S. 28, L. 2, P. 38, E. 2.

No temperature chart is available in this case.

CASE 22.—Ref. No., Vol. 161, No. 209; Post-mortem No. 171, 1899.—Mary L., æt. 45, a laundress, was admitted under Dr. Pitt for progressive anæmia and for weakness, on May 26th, 1899, and died on May 30th, 1899. She said she had always been feeble, though she had had no more definite illness than "bad eyes," for which she was in Ruth Ward in 1882. Eleven months before her final admission she began to find walking very much harder than usual; by degrees she got worse, and eight months ago nausea began to be very troublesome. Latterly she had found that the only way to avoid being sick after every meal was for her to lie down immediately after eating. This vomiting may, at least in part, have been due to arsenic which she had been taking regularly for some while. She was a stout-looking woman, not wasted, but profoundly anæmic and yellowish. The liver dulness came two inches below the costal margin, but the edge of the organ could not be definitely felt. The spleen was not felt. The urine had a specific gravity of 1.008, and it contained neither albumin nor urobilin so far as ordinary tests showed. The vomit contained no free HCl. There were retinal hæmorrhages. The patient became very restless, and shortly went into a coma, in which she died. Thirst and palpitations were occasionally prominent symptoms. The subcutaneous fat was abundant, and of the typical primrose yellow colour. The brain and spinal cord both seemed natural. The retinæ exhibited many small hæmorrhages. The lungs were œdematous, the pleuræ natural. The heart weighed fourteen ounces, exhibited many epicardial petechiæ, some excess of bright yellow superficial fat, and typical tabby-cat striations of muscoli papillares; the fatty degeneration was confirmed microscopically. The stomach and intestines looked natural both to the naked eye and microscopically. There was no ascites. The liver weighed sixty-four ounces, was of the typical dull brown colour, and gave a very deep Prussian blue to the ferrocyanide test. The spleen weighed nine ounces. The left kidney weighed eight and a half ounces, being in a condition of compensatory hypertrophy on account of the right having been converted

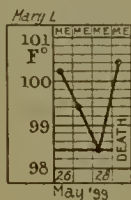
* *Note.*—S. = Small lymphocytes.
 L. = Large hyaline lymphocytes.
 P. = Polymorphonuclear cells.
 E. = Coarsely granular eosinophile cells.
 B. = Basophile leucocytes.
 M. = Myelocytes.

by a calculus, which was present, into a hydronephrotic bag weighing only one ounce. The pelvic organs were natural. The blood counts were as follows:—

| Date. | Red corpuscles, per cub. mm. | Red corpus- cles, per cent. of normal. | Hæmoglobin, per cent. of normal. | Colour index. | Leucocytes per cub. mm. |
|--------------|---------------------------------|--|--|---------------|-------------------------------|
| 27 May, 1899 | 700,000 | 14 | "Very low" | — | No leuco- cytosis. |

Note.—Films showed marked poikilocytosis and megalocytosis, together with many nucleated red cells.

The temperature chart was as follows:—



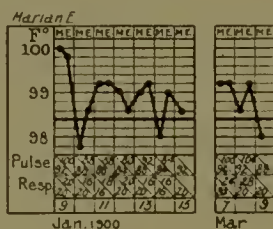
CASE 23.—Ref. No., Vol. 167, No. 32.—Marian E., æt. 53, a spinster and a dressmaker, was admitted under Dr. Perry on January 5th, 1900, and discharged, very greatly relieved, on May 30th, 1900. Her main complaint was of "loss of power in the legs." She had never been out of England. She stated that she had always been healthy until the last few years. Six years ago she had lost a great deal of blood per rectum; the cause was not clear. Two years ago she nursed a patient through scarlet fever, and after it she had symptoms that were diagnosed as "congestion of the lungs," from which she was ill seven weeks. Loss of power in both legs dated back for over a year previous to her admission. The weakness was due to lateral sclerosis, and it was so marked that the patient was quite unable even to stand. Six months ago she had an attack of severe vomiting and diarrhœa; three weeks ago, involuntary micturition lasting a week. The diagnosis of pernicious anæmia was apparently made only after the nerve symptoms had been present for some time. On admission the skin was the typical pale yellow colour. The knee-jerks were exaggerated, there was ankle clonus on both sides, and the electrical reactions were normal. At the same time there were sensations of undue tingling in the hands and arms. There were brown pigmentary spots all over the patient, and laterly numerous petechiæ had appeared. There were no retinal nor other hæmorrhages. The heart was of normal size, but there were hæmic systolic bruits in the mitral and aortic areas and over the abdominal aorta. There was slight œdema of the ankles. The urine had a specific gravity of 1020; it was acid, contained no albumin and no blood, but an abundance of indican and also of urobilin to the ordinary spectroscopic test. Both kidneys were palpable. The spleen was felt to be enlarged and firm, but the liver was not felt. The teeth were in only fair condition, but the mouth was clean. Vomiting and diarrhœa were marked symptoms at times, but possibly they may have been due to the arsenical treatment adopted. The pulse rate averaged 88 to 96, the respiration

ate 18 to 24, and the temperature was over 99° F. each day, and sometimes 100° F. Although the patient's blood became almost normal by the time of her discharge, the relief was but short-lived, the report received from the old address on August 15th, 1907, being that "Miss E. died in Hastings Hospital on October 10th, 1900." The blood counts were as follows:—

| Date. | Red corpuscles, per cub. mm. | Red corpus- cles, per cent. of normal. | Hæmoglobin, per cent. of normal. | Colour index. | Leucocytes per cub. mm. |
|-----------------|---------------------------------|--|--|---------------|-------------------------------|
| | Thoma Zeiss. | | Oliver or Fleischl. | | Thoma Zeiss. |
| 5 January, 1900 | 1,237,000 | 25 | 43 (Fl.) | 1.720 | 5,000 |
| 16 " " | 1,250,000 | 25 | 40 " | 1.600 | 3,125 |
| 24 " " | 1,855,469 | 37 | 40 " | 1.081 | 3,125 |
| 21 February " | 3,530,000 | 71 | 70 (Ol.) | 0.985 | — |
| 9 March " | 5,000,000 | 100 | ? | — | — |
| 27 " " | 5,390,000 | 108 | 105 (Ol.) | 0.972 | 4,130 |

Note.—Many poikilocytes and megalocytes. No nucleated red cells obvious.

The temperature chart was as follows:—

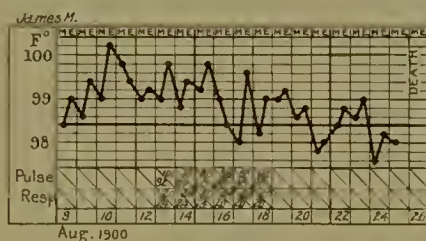


CASE 24.—Ref. No., Vol. 166, No. 206; Post-mortem No. 281, 1900.—James M., æt. 52, a Bombay merchant, was admitted for persistent diarrhœa and for general weakness, under the care of Dr. Pitt, on August 7th, 1900, dying on August 28th, 1900. He had been in India for thirty years, and had led the life of a strong athletic man. Twenty-five years ago he had had dysentery and bad hepatic trouble of some kind, but he recovered completely. As a young man he had had syphilis, but he was treated for "some time," and, so far as could be told, he had been cured. Latterly he had for some years been drinking heavily. His present symptoms dated back three and a half years previously to his admission. He stated that he got extremely wet on a journey up country, after which severe diarrhœa set in and never left him afterwards. Sprue was suggested. During the whole three and a half years he had never been free from troublesome diarrhœa, except for at most a day or two at a time. Very gradually he got weaker, and presently found it impossible to continue his work as a mercantile broker. He was in Bombay Hospital for six weeks, and it was from there that he was invalided home and came to Guy's Hospital. On admission he had a sallow complexion. The liver could be felt, the spleen not. The heart was of natural size, but exhibited a hæmic bruit at the impulse. There were subcutaneous hæmorrhages on the legs and back. The nervous system seemed natural. The urine was normal in colour, of specific gravity varying between 1008 and 1012; it contained a trace of albumin. The diagnosis at

first was "severe anæmia secondary to diarrhœa." A blood count later indicated pernicious anæmia, which was confirmed post-mortem. Towards the end the patient became light-headed, persistently getting out of bed before he gradually sank and died. The temperature was typically 99°F. to 100°F. nearly every day. The pulse rate varied from 84 to 104. Diarrhœa five times a day precluded the giving of arsenic, so that treatment was by opium, hæmatoxylin, and β -naphthol. Post-mortem, the heart, lungs, stomach, and intestines were recorded as natural. The liver was big, and gave a typical Prussian blue reaction, in addition to which it was in an early stage of cirrhosis. The spleen was large and soft. The kidneys were of a pale yellowish colour. There was apparently no œdema in this case. The blood counts were as follows:—

| Date. | Red corpuscles, per cub. mm. | Red corpus- cles, per cent. of normal. | Hæmoglobin, per cent. of normal. | Colour index. | Leucocytes per cub. mm. |
|-----------------|---------------------------------|--|--|---------------|-------------------------------|
| 16 August, 1900 | Thoma Leitz. 600,000 | 12 | 30 | 2.500 | 5,000 |
| 24 " " | 1,000,000 | 20 | — | — | 3,800 |

The temperature chart was as follows:—



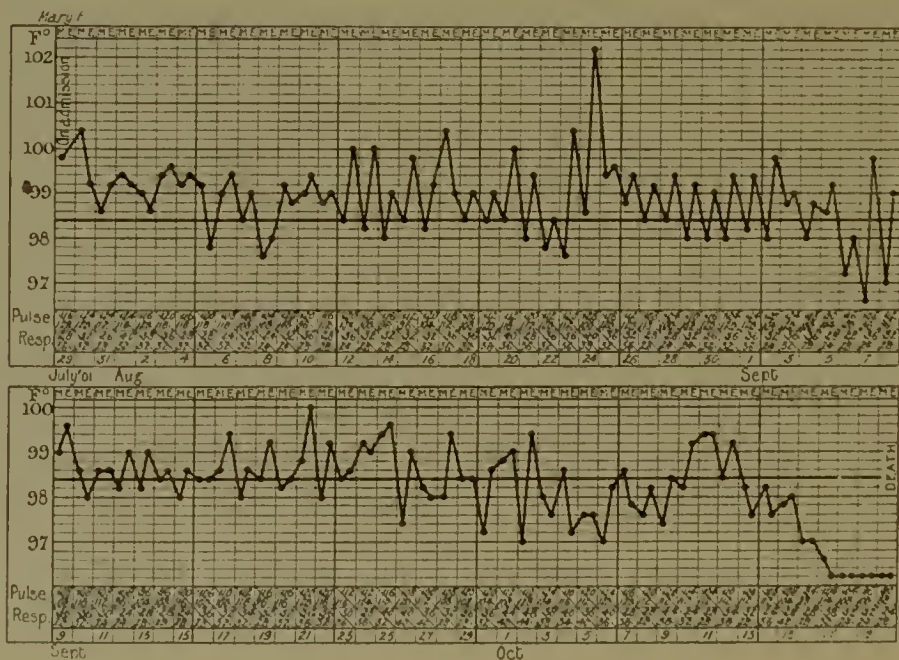
CASE 25.—Ref. No., Vol. 169, No. 272; Post-mortem No. 387, 1901.—Mary F., æt. 32, a market gardener, was admitted for general weakness under the care of Dr. Taylor on July 29th, 1901, and she died on October 21st, 1901. She was a married woman with two children, the youngest of whom was eight. She had never been out of England, and she had been perfectly well until about a year before her admission, when she began to feel weak and languid, with attacks of giddiness and faintness and pains in the sides and back. There appeared to have been neither diarrhœa nor vomiting. She was exceedingly weak and of the lemon colour, and she was described as "neurotic and hysterical." The whole body, except the face, was covered with petechial hæmorrhages, though there was no history of any other bleedings; there had been amenorrhœa for seven months. The temperature chart shows the typical slight evening pyrexia continuously for three months. Both liver and spleen were palpable an inch below the ribs. The teeth were "in a very bad state." There was no tenderness of bones. The urine was turbid, of a pale amber colour, and specific gravity 1010; there was no albuminuria, but urobilin was found in abundance. The left knee-jerk was just obtainable, but the right was not obtained; there was decided anæsthesia of all the finger tips. There was a marked bruit de diable in the neck, and later a bruit de galop at the cardiac

impulse, due to dilatation apparently, for there was pericarditis post-mortem. There was slight œdema of the ankles occasionally, and before death epistaxis occurred more than once. There was no rally, and the patient died of exhaustion, after becoming first extremely drowsy and then comatose. At the autopsy there was about a pint of serous fluid in each pleural cavity; the lungs and pleuræ were both healthy, except for the apical scarring of healed phthisis. The heart weighed 361 grams, and its muscle was brown, with pallid streaks of obvious fatty change. There was neither endocarditis nor pericarditis. The liver weighed 1,521 grams, and the Prussian blue reaction in it was not marked. On this account it is possible that the case should not be classed as one of pernicious anæmia, and yet the condition of the blood was typical enough. The spleen was big, weighing 341 grams; it contained two infarcts; it gave no ferrocyanide reaction. The kidneys together weighed 386 grams; they contained old and recent infarcts, but otherwise they were natural, except for anæmic pallor. It is a pity that no mention is made of the iron reaction in them, for in exceptional cases there is a much deeper blue in the kidney cortex than in the liver. The blood counts were as follows:—

| Date. | Red corpuscles, per cub. mm. | Red corpus- cles, per cent. of normal. | Hæmoglobin, per cent. of normal. | Colour index | Leucocytes per cub. mm. |
|---------------|---------------------------------|--|--|--------------|-------------------------------|
| | Thoma Zeiss. | | Haldane. | | Thoma Zeiss. |
| 30 July, 1901 | 647,619 | 13 | 11 | 0.846 | 2,857 |
| 10 Aug. " | 670,000 | 13 | 15 | 1.154 | 6,850 |
| 21 " " | 562,500 | 11 | 12 | 1.091 | 2,500 |
| 18 Sept. " | 600,000 | 12 | 11 | 0.916 | 8,000 |
| 4 Oct. " | 600,000 | 12 | 12 | 1.000 | 3,200 |

Note.—Poikilocytosis was extreme.

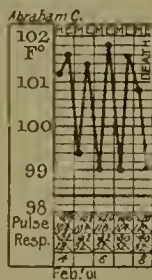
The temperature chart was as follows:—



CASE 26.—Ref. No., Vol. 171, No. 80; Post-mortem No. 45, 1901.—Andrew C., æt. 58, a newspaper correspondent, was admitted under Dr. Pitt on January 30th, 1901, and died on February 8th, 1901. He came in for extreme epistaxis, with extensive and large purpuric extravasations and bleeding from the gums. There were retinal hæmorrhages and extreme anæmia; lobar pneumonia set in and caused rapid death. He gave the history that his heart had troubled him greatly for twenty years, during which time he had had numbers of syncopal attacks. Otherwise he had been well until hæmorrhages began without apparent cause two months before admission. At first he only noticed blood in his mouth on waking in the morning, but later spontaneous epistaxis set in, and it was too severe to check. He looked pale and bloodless. There was a systolic bruit at the base; the cardiac impulse was in its normal place. Neither liver nor spleen could be felt. The nervous system seemed natural. The urine was of specific gravity 1020, and of dark amber colour; it contained neither blood nor albumin. Retention of urine occurred, necessitating the use of a catheter, shortly after which the patient died with a gurgling noise. At the autopsy the brain exhibited some excess of serous subarachnoid fluid; there was no intracranial hæmorrhage. There was recent pleurisy on the left side and a patch of early terminal pneumonia under it. The heart weighed 444 grams., but presented no particular abnormality. The liver weighed 2,030 grams; it was a chocolate-blancmange colour, and gave a very good Prussian blue reaction. The kidneys together weighed 405 grams; they were pallid but otherwise healthy; they gave no iron reaction. The spleen weighed 207 grams. The fact that the patient's temperature rose to 102° is explainable by reason of the pneumonia. The blood count has not been completely recorded; the chief proof of pernicious anæmia is therefore the iron reaction in the liver:—

| Date. | Red corpuscles, per cub. mm. | Red corpus- cles, per cent. of normal. | Hæmoglobin, per cent. of normal. | Colour index. | Leucocytes per cub. mm. |
|----------------|---------------------------------|--|--|---------------|-------------------------------|
| February, 1901 | Thoma Zeiss. 1,925,000 | 38 | ? | — | Thoma Zeiss. 8.125 |

The temperature chart was as follows:—



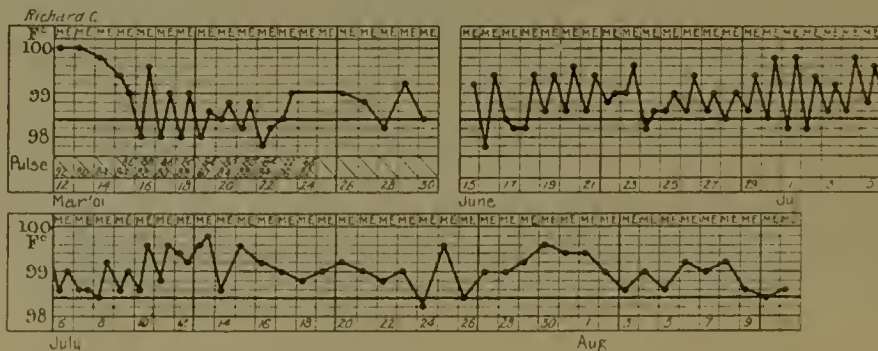
CASE 27.—Ref. No., Vol. 171, No. 107.—Richard C., æt. 44, a tailor, was admitted under Dr. Pitt on March 12th, 1901, and was discharged relieved on August 13th, 1901. He came in for great and increasing weakness. In September, 1899, a year and a half before admission, when he had hitherto been strong and well, the present trouble began in a manner that seemed almost sudden. He came over faint when out for a walk, and had to sit down. He recovered in an hour or so, and paid little heed to the occurrence; but three months later the same thing happened again; and since then he

had suffered from increasing physical weakness. In August, 1900, he had to lie up in bed for seven weeks. On twenty or thirty occasions there had been epistaxis. Dyspnœa upon any exertion was marked. Appetite remained good, but indigestion was easily produced. There was no œdema, and no other hæmorrhage than epistaxis. There was a decided tendency to diarrhœa. He said he had lost two stone in weight, but he looked well nourished. His pulse rate averaged 92, his respiration rate 22. The teeth were good, but black from smoking. The heart was normal in size, but there were hæmic bruits in all areas. The urine had a specific gravity of 1014; it was free from albumin and from blood; ? indican, ? urobilin. The nervous system was natural except for some decided numbness of the fingers. The retinæ presented no hæmorrhages. Neither liver nor spleen was felt. The patient was treated with arsenic and made one rally, but relapsed whilst still under observation and went out very ill. A friend, writing on August 20th, 1907, says: "Richard Croft died within a month of leaving Guy's. . . ." The blood counts were as follows:—

| Date. | Red corpuscles, per cub. mm. | Red corpus- cles, per cent. of normal. | Hæmoglobin, per cent. of normal. | Colour index. | Leucocytes per cub. mm. |
|----------------|---------------------------------|--|--|---------------|-------------------------------|
| | Thoma Zeiss. | | ? Haldane. | | Thoma Zeiss. |
| 12 March, 1901 | 1,560,000 | 31 | 10 | 0.323 | 6,000 |
| 22 " " | 1,058,333 | 21 | 10 | 0.476 | 6,000 |
| 30 " " | 916,666 | 18 | 23 | 1.278 | 5,675 |
| 4 April, " | 1,903,000 | 38 | 30 | 0.789 | 3,000 |
| 13 " " | 1,458,300 | 29 | 30 | 1.035 | — |
| 22 " " | 1,634,400 | 33 | 30 | 0.909 | 4,688 |
| 6 May, " | 2,566,666 | 51 | 30 | 0.588 | 6,875 |
| 18 " " | 1,874,900 | 37 | 33 | 0.892 | 7,810 |
| | Went to convalescent | | home for a short time. | | |
| 11 June, " | 240,000 | 5 | 10 | 2.000 | 8,100 |
| 20 " " | 900,000 | 18 | 10 | 0.555 | 8,678 |
| 5 July, " | 920,000 | 18 | 15 | 0.833 | — |
| 15 " " | 1,200,000 | 24 | 17 | 0.708 | — |
| 19 " " | 900,000 | 18 | 20 | 1.111 | — |
| 24 " " | 850,000 | 17 | 15 | 0.882 | — |
| 29 " " | 830,000 | 17 | 15 | 0.882 | — |
| 3 August " | 860,000 | 17 | 15 | 0.882 | — |
| 7 " " | 924,000 | 18 | — | — | — |
| 13 " " | 943,000 | 19 | 30 | 1.579 | — |

Note.—Films presented many poikilocytes, megalocytes and microcytes. The count of June 11th is possibly in error on the low side; but even allowing for this it is amongst the very lowest on record.

The temperature chart was as follows:—



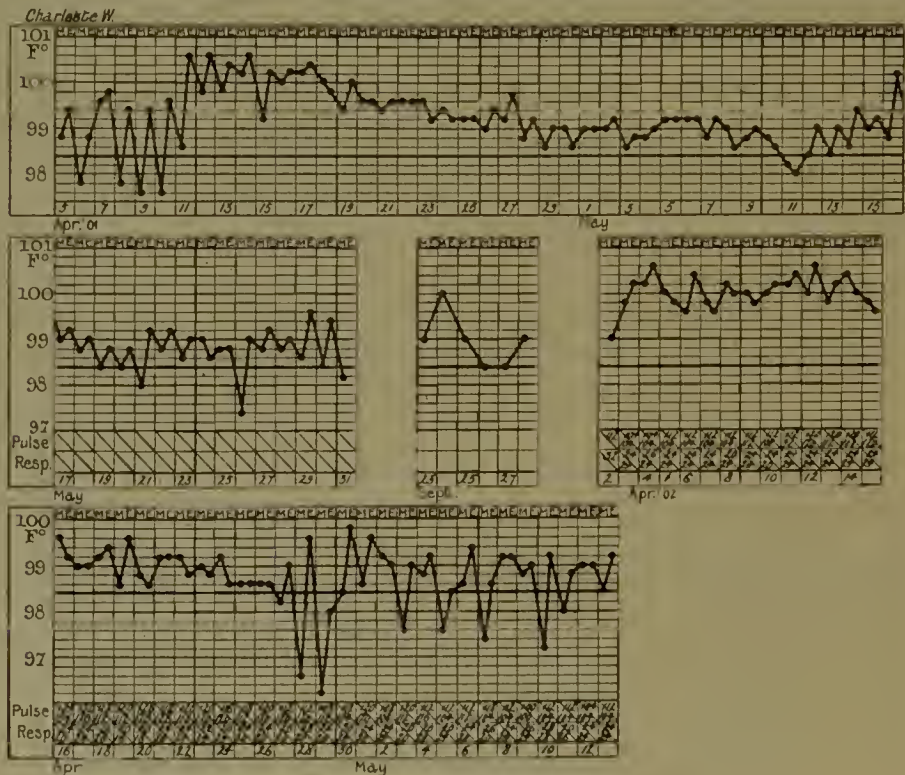
CASE 28.—Ref. Nos., Vol. 171, No. 346; Vol. 173, No. 192; Vol. 178, No. 194; Post-mortem No. 217, 1902.—Charlotte W., æt. 49, a cook, was admitted under Dr. Bryant, on April 4th, 1901, to be discharged slightly relieved on May 10th, 1901. She was re-admitted, under Dr. Pitt, on September 19th, 1901, and re-discharged greatly relieved on October 12th, 1901. She was re-admitted once more on April 2nd, 1902, and died in hospital on May 16th, 1902. She originally came in for vomiting and for being so weak that she could not do her work. She was a widow, and had had no children. Her present trouble began a year before her first admission, and for nine months she was unable to work. She attributed her illness to a sudden attack of diarrhœa and vomiting, which came on abruptly whilst she was lifting a heavy bath. During the twelve months previous to her admission her symptoms had been chiefly gastro-intestinal, together with progressive anæmia and weakness, the various diagnoses suggested being gastric ulcer, gastro-enteritis, and acute or chronic dyspepsia. After her first admission she remained at work for a month, but then gradually relapsed. Her history between the second and third admissions is given below. She was of the pale yellow tint, and "somewhat thin." Her pulse rate averaged 84, her respiration rate 24; the temperature when the patient was most ill was nearly always 100° F. each night. The heart was not enlarged; there were hæmic bruits in all areas. Neither liver nor spleen was felt. There were no retinal hæmorrhages, but there was some degree of optic neuritis, and the fields of vision were concentrically contracted. The urine was not abnormally dark. Vomiting and nausea became prominent symptoms sometimes, partly perhaps as the result of arsenical treatment. Antistreptococcal serum was also used in this case. After her second discharge she continued at work for nearly five months, and then suddenly collapsed after trying to lift a heavy weight. She had to take to her bed at once, and stayed there till her death. She was by now decidedly thinner than at first—indeed, actually wasted. The knee-jerks were very difficult to obtain, and there were shooting pains in the legs and arms, so that very likely the wasting was partly due to peripheral neuritis, and this in turn may have been induced by arsenic. The urine was now rich in urobilin, and occasionally contained a trace of albumin. She died gradually of heart failure. The post-mortem examination revealed the bright primrose yellow colour of the subcutaneous fat, and slight œdema of the legs, arms, and body. The left pleura was generally adherent; the right contained 1200 c.c. of serous exudate; the lungs showed healed phthisis, and they were pale and œdematous, but otherwise normal. The heart weighed 311 grams; the pericardium was healthy, and the valves normal, but the muscle was pale and brownish, and exhibited typical tabby-cat striation. The liver weighed 1512 grams, was of the usual café-au-lait colour, and gave a very marked Prussian blue reaction. Microscopically there were very marked granules in the hepatic cells. The spleen looked

normal microscopically. The kidneys weighed 351 grams together. There is no mention of the Prussian blue test being applied to spleen or kidneys. The blood-counts were as follows :—

| Date. | Red corpuscles, per cub. mm. | Red corpus- cles, per cent. of normal. | Hæmoglobin, per cent. of normal. | Colour index. | Leucocytes per cub. mm. |
|----------------|---------------------------------|--|--|---------------|-------------------------------|
| | Thoma Zeiss. | | | | |
| 10 April, 1901 | 650,000 | 13 | 26 | 2.000 | 7,000 |
| 15 May, " | 1,800,000 | 36 | 41 | 1.139 | 5,000 |
| 26 " " | 1,800,000 | 36 | 40 | 1.111 | 7,000 |
| 20 Sept., " | 1,800,000 | 36 | 60 Tollquist | 1.666 | — |
| 30 " " | 1,600,000 | 32 | 42 | 1.312 | — |
| 2 Oct., " | 1,512,000 | 30 | 33 Haldane | 1.100 | — |
| 7 " " | 4,250,000 | 85 | 36 " | 0.423 | — |
| 11 " " | 5,050,000 | 101 | 40 " | 0.396 | — |
| 3 April, 1902 | 785,714 | 16 | 25 " | 1.562 | 6,406 |
| 23 " " | 699,000 | 14 | 20 " | 1.429 | 9,750 |
| 14 May, " | 876,000 | 15 | 10 " | 0.666 | 4,800 |

Note.—10th April, 1901, numerous poikilocytes, microcytes, megalocytes, nucleated red cells. 3rd April, 1902, two nucleated red cells seen, many poikilocytes, megalocytes and microcytes. 14th May, 1902, the differential leucocyte count was as follows :—S. 25, L. 3, P. 70, E. 2.

The temperature chart was as follows :—



CASE 29.—Ref. No., Vol. 171, No. 132; Post-mortem No. 148, 1901.—Henry S., æt. 67, a tin solderer, was admitted under Dr. Pitt for constipation and vomiting on 19th April, 1901, and died on 9th May, 1901. For at least three years previously he had been getting paler and more anæmic, and he had complained of insomnia. Until then he could cycle well, but since then he had been too weak to do so. He had been getting gradually lighter for two and a half years past. He had been treated for hypochondriasis. He had no teeth at all. Neither liver nor spleen was palpable. He suffered from low muttering delirium at nights, getting out of bed continually, and so forth. He complained of numbness and tingling in his fingers; the knee-jerks were either absent or extremely sluggish, though the pupils reacted normally. There were no obvious hæmic bruits. The urine had a specific gravity of 1012, and it contained excess of urobilin. On May 2nd a sudden mental change occurred, the hands and arms were tossed about in all directions, and the patient expectorated continually and everywhere; he had fits of imbecile laughter also; bed-sores developed, and in a week coma and death ensued. The skin and subcutaneous fat were typically yellow, but not jaundiced. The marrow of the femur was dark-red like fresh blood clot. The brain exhibited a triangular-shaped effusion of blood in the right temporo-occipital cortex. The lungs were the seat of septic bronchopneumonia associated with early acute pleurisy. The heart presented no pericarditis and no valvular change, but well-marked tabby-cat striation. The liver was of normal size and colour; it gave the Prussian blue reaction, but to a much less degree than do many cases of pernicious anæmia. The spleen was of normal size. The kidneys looked pale, but otherwise natural, but they gave some degree of Prussian blue reaction. Microscopically the marrow of the femur was found to contain normoblasts in abundance. The liver cells showed yellow-brown pigment granules within them, especially at the periphery of the lobules. A section of one of the muscles of the legs showed the fibres and their nuclei staining badly, the longitudinal striations being much less definite than usual. There was a good deal of pigmentary deposition in the cardiac muscle fibres, but not much fatty change. The stomach exhibited much small-celled infiltration of the submucous coat. There was only one blood count as follows:—

| Date. | Red corpuscles, per cub. mm. | Red corpus- cles, per cent. of normal. | Hæmoglobin, per cent. of normal. | Colour index. | Leucocytes per cub. mm. |
|----------------|---------------------------------|--|--|---------------|-------------------------------|
| 20 April, 1901 | Thoma Zeiss. 1,120,000 | 22 | 28 | 1.273 | Thoma Zeiss. 2,820 |

No temperature chart is available in this case.

CASE 30.—Ref. Nos., Vol. 169, No. 201; Vol. 181, No. 24, and Vol. 184, No. 365; Post-mortem, No. 238, 1903.—Charlotte R., æt. 46, a housewife, was admitted under Dr. Taylor on June 5th, 1901, and discharged on August 3rd, 1901. She came in for "jaundice," which was the lemon yellow colour typical of pernicious anæmia. She was a married woman with two children.

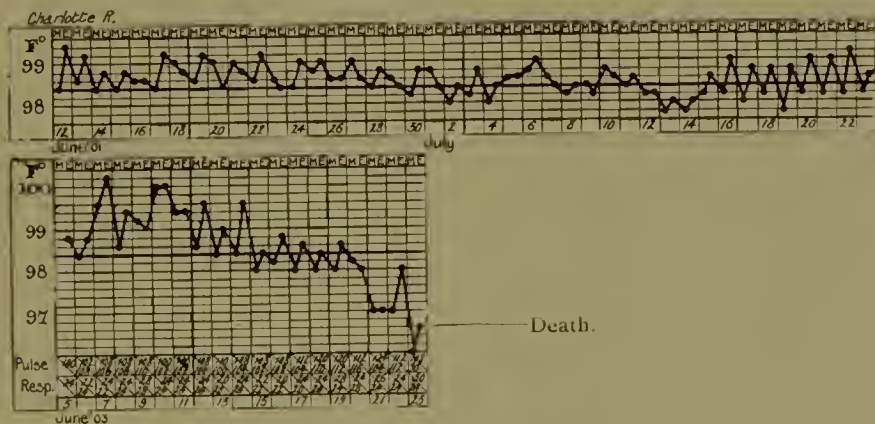
She had been a sufferer from "indigestion" frequently, and this had been particularly severe for two months before admission. She had also lost much weight. She looked thin; her face and body were primrose yellow, but her conjunctivæ were quite white. The teeth were scanty, but those that were left were sound and clean, and there was no stomatitis. There was extensive freckle-like pigmentation of the skin over her abdomen, back, and limbs. The liver, smooth, firm, and uniform, was palpable two inches below the ribs in the right nipple line. The spleen was not felt. The urine varied in specific gravity between 1010 and 1020; urobilin was not mentioned. The optic discs and retinæ were natural, and so were the reflexes. The temperature chart was typical. Treatment was by arsenic, and dentures were supplied. The patient was readmitted under the care of Dr. Shaw on November 28th, 1902, and discharged again relieved on January 6th, 1903. A tendency to rheumatoid arthritis had greatly increased meanwhile, and since her last discharge she had not been out of doors, as her knees had been too painful. There was also marked ulnar flexion of the fingers at the metacarpophalangeal joints, and spindle-shaped swelling of the first interphalangeal joints. She also suffered from troublesome "knocking noises" in her head and great dizziness, especially on stooping. She had gradually lost colour again, and had become so weak that she was exhausted by the slightest exertion. There were hæmic bruits in all areas, a bruit de diable in the neck, and slight œdema of the ankles. There had been amenorrhœa since the illness began, though previously the menses had been regular and normal. The urine contained neither blood, albumin, nor urobilin; it deposited uric acid crystals spontaneously on standing. Again there were no retinal or other hæmorrhages. Greatly relieved by January, 1903, she remained "quite well" for four months, and then she noticed that everything she ate tasted sweet, even acid and salt things did so. She became weaker and weaker, her appetite failed, and she became very short of breath. Her bowels were regular. She was re-admitted under Dr. Shaw on June 8th, 1903, and died on June 24th, 1903. The liver was large and smooth as before, the spleen was now palpable, and there were retinal hæmorrhages. The urine again contained no obvious urobilin. The reflexes were natural. Œdema of the legs was considerable, and it increased, extending to the thighs and back, and finally to the arms. The patient became delirious and died comatose. At the post-mortem examination the body was noted to be thin, but not emaciated; the subcutaneous fat was plentiful and bright yellow, the muscles a dull brown. The bone marrow of the femur was dark red, and microscopically exhibited no fat, but a dense mass of cells, amongst which one could see many erythroblasts of various sizes, large bone-marrow corpuseles, and many white blood corpuseles. The lungs and pleuræ were healthy. The heart weighed 294 grams, was coated by a thick external layer of lemon-yellow fat, had normal valves, and exhibited typical "tabby-cat" striations inside the left ventricle, especially on the musculi papillares. The stomach and intestines looked pallid, but otherwise natural. The liver weighed 1,312 grams; it was of a pale chocolate colour, and on close inspection it could be seen that the periphery of each lobule was darker and browner than the centre, which was yellower. The organ gave a very marked iron reaction. The pancreas exhibited pigmentary changes. The spleen weighed 130 grams; it was not tested for iron; nor were the kidneys, which together

weighed 260 grams, and looked natural except for pallor. The blood counts were as follows:—

| Date. | Red corpuscles, per cub. mm. | Red corpus- cles, per cent. of normal. | Hæmoglobin, per cent. of normal. | Colour index. | Leucocytes per cub. mm. |
|---------------|---------------------------------|--|--|---------------|-------------------------------|
| | Thoma Leitz. | | Haldane. | | Thoma Leitz. |
| 11 June, 1901 | 1,466,666 | 27 | 39 | 1.444 | 11,428 |
| 5 July, " | 2,600,000 | 52 | 42 | 0.808 | — |
| 18 " " | 3,160,000 | 63 | 75 | 1.190 | — |
| 29 Nov., 1902 | 440,000 | 9 | 17 | 1.888 | 3,640 |
| 2 Dec., " | 752,000 | 15 | 21 | 1.400 | 3,800 |
| 8 " " | 1,284,000 | 26 | 32 | 1.230 | 3,400 |
| 10 " " | 1,294,000 | 26 | 32 | 1.230 | 2,800 |
| 21 " " | 2,334,000 | 47 | — | — | 4,600 |
| 27 " " | 3,296,000 | 66 | 58 | 0.879 | 4,600 |
| 6 Jan., 1903 | 3,864,000 | 77 | 60 | 0.779 | 7,032 |
| 6 June, " | 683,333 | 14 | 20 | 1.429 | 8,520 |

Note.—June 11th, 1901: Many poikilocytes, megalocytes, microcytes, and many nucleated red cells. July 18th, 1901: Megalocytes numerous. Poikilocytes fewer, no nucleated red cells. November 29th, 1902: Poikilocytes and megalocytes, and nucleated red cells numerous. Sp. gr. 1027. The differential leucocyte count was as follows:—S. & L. 38, P. 59, E. 1.7, B. 1.3. June 6, 1903: Typical films

The temperature chart was as follows:—



CASE 31.—Ref. No., Vol. 171, No. 382.—James C., æt. 63, a gardener's labourer, was admitted under the care of Dr. Pitt on October 14th, 1907, and was discharged greatly relieved on November 2nd, 1907. He was a widower with eight children. In the spring of 1901 he had what he termed "jaundice," associated with great soreness of his mouth; the latter was so troublesome that he had been unable to smoke a cigarette for the five months previous to his admission. Besides these more acute symptoms he stated that he had suffered from throbbings in the head and from being weak and generally out of health ever since the loss of his wife in July, 1900. He had not lost bulk;

his weight on admission was 123 lbs., and it rose to 132 lbs. in a little over a fortnight. He was in the habit of having his bowels moved twice a day regularly. He was a typical lemon-yellow case, the "jaundice" having been in reality the pernicious anæmia colour, and not true jaundice. The temperature tended to be persistently subnormal, thus differing materially from most cases. The pulse rate averaged 74, and the respiration rate 20. The teeth were decayed and in poor condition. The liver was palpable on admission, but not later, and the spleen was not felt. No hæmic bruit was recorded. The urine was straw-coloured and of specific gravity 1012; indican and urobilin are not mentioned; neither albumin nor blood was present. There was no œdema; but before admission there had been a little at times around the ankles. The long bones were decidedly tender. The reflexes were normal. Treatment was by means of arsenic. A former acquaintance reports on August 22nd, 1907, that "James C. went away to the country and has been lost sight of." The rate of recovery of the blood in this case was noteworthy:—

| Date. | Red corpuscles, per cub. mm. | Red corpus- cles, per cent. of normal. | Hæmoglobin, per cent. of normal. | Colour index. | Leucocytes per cub. mm. |
|-------------------|---------------------------------|--|--|---------------|-------------------------------|
| | Thoma Zeiss. | | Haldane. | | Thoma Zeiss. |
| 22 Oct., 1907 ... | 967,500 | 19 | 30 | 1.579 | 17,000 |
| 2 Nov., " ... | 2,350,000 | 47 | 45 | 0.957 | — |

Note.—Poikilocytes abundant; no nucleated red cells seen.

No temperature chart is available in this case.

CASE 32.—Ref. No., Vol. 175, No. 168; Post-mortem No. 283, 1902.—Hilda D., æt. 10, a schoolgirl, was admitted under the care of Dr. Taylor on June 27th, 1902, for general weakness, extreme anæmia, and vomiting. She was most gravely ill, and died two days later, on June 29th, 1902. It is quite possible that this case should not be classed as one of pernicious anæmia, for the blood count did not show a high colour index; and her brother died the same year in Guy's Hospital of an affection diagnosed in his case as "splenic anæmia"; on the other hand, the ferrocyanide reaction in the liver and kidneys at the autopsy suggest pernicious anæmia. At six months of age she had had a very bad illness, of which vomiting and pains in the limbs had been the main symptoms. She recovered completely, but at five years of age she had a precisely similar attack; and a third when she was six. In each of these last two attacks the illness was diagnosed as splenic anæmia. On June 22nd, 1902, she suffered from a fourth and final attack which began with severe vomiting and with pains all over the body and limbs, especially in the calves of the legs. She was very thin on admission, and extremely anæmic, and of a sallow yellow colour both as to her face and as to her whole body. The spleen could just be felt. The liver was not palpable. There was a blowing systolic hæmic bruit in the mitral, aortic and pulmonary areas. The temperature rose to 101.4°F., the pulse rate to 160, the respiration rate to 60, and the patient died of exhaustion. The post-mortem

examination showed that the skin generally was of a sallow yellow colour, without jaundice; there was very little subcutaneous fat, and no œdema. The lungs and pleuræ were healthy. The heart weighed 147 grams, was covered by lemon yellow fat externally, and exhibited much fatty striation internally, especially in the left ventricle; the valves were normal. The liver weighed 826 grams, was of the "coffee blanc-mange" colour so often seen in pernicious anæmia, and gave a marked ferrocyanide reaction. The spleen weighed 246 grams, it was large, firm, and contained a big red recent infarct. The lymphatic glands seemed to be natural. The kidneys together weighed 104 grams; they were pallid, and gave a marked iron reaction to the ferrocyanide test. The blood count on the day after admission was as follows:—

| Date. | Red corpuscles, per cub. mm. | Red corpus- cles, per cent. of normal. | Hæmoglobin, per cent. of normal. | Colour index. | Leucocytes per cub. mm. |
|---------------|---------------------------------|--|--|---------------|-------------------------------|
| 28 June, 1902 | Thoma Leitz. 1,300,000 | 26 | Haldane. 18 | 0.692 | Thoma Leitz 23,500 |

Note.—The leucocytes were chiefly polymorphonuclear cells, though neither suppuration nor pneumonia was found post-mortem.

No temperature chart in this case was available.

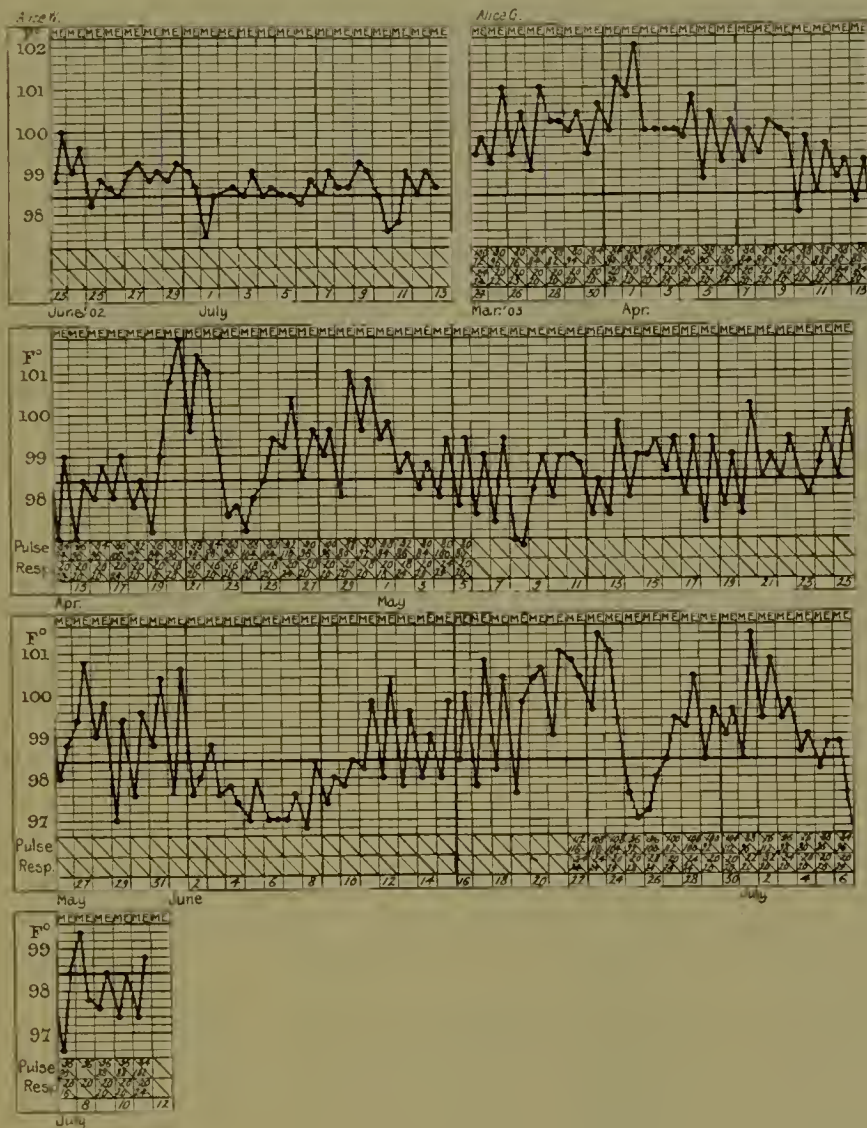
CASE 33.—Ref. No., Vol. 177, No. 173: Vol. 182, No. 121; Post-mortem No. 258, 1903.—Alice G., æt. 51, a housewife, was admitted under the care of Dr. Pitt, on March 23rd, 1903, and she died on July 11th, 1903. It is of interest that she was also in hospital in 1902 (June 19th to July 14th), at which time the pernicious anæmia was not obvious, although looking back at it the illness at that time was clearly the same as that from which she ultimately died. In 1902 she was admitted, under her maiden name of Alice Wain, for "general weakness and anæmia," having first complained of an increasing feeling of tiredness in April, 1902. She also noticed that her feet and ankles swelled whenever she was long upon them, and she had a tight feeling across her chest. Four weeks from the first notice of there being anything the matter she began to have troublesome diarrhœa. Her temperature was often 99° F., and on several occasions 99.4° and 99.6°. She was described as "a pale woman with some colour in her cheeks." She was discharged relieved in 1902, and reported that she remained "quite well" from September, 1902, until February, 1903. She then attended as an out-patient for "anæmia and retching," and as she did not improve she was admitted. There were no hæmorrhages, nor had there been any. The patient was a "small, thin, pale woman." Her pulse rate averaged about 90, her respiration rate about 24, and her temperature was usually about 99° F. at night. The liver could be felt one and half inches below the costal margin; the spleen was not palpable; the heart was not obviously enlarged, but it presented loud hæmic bruits both at the impulse and at the base, and there was a venous rumble in both sides of the neck. The urine had a specific gravity of 1020; it was of a full yellow colour, and sometimes it

contained a trace of albumin. There was no obvious urobilin and no excess of indican. Œdema of the legs increased, until finally it extended up into the thighs and back, though there was no ascites. The patient died of exhaustion. At the autopsy the bone marrow of the femur was dark red; the heart weighed 199 grams, and exhibited both tabby-cat striations and petechial hæmorrhages; the liver weighed 1390 grams, and gave an extremely good Prussian blue reaction: the spleen weighed 181 grams; the greater part of the alimentary canal looked perfectly natural, but the sub-mucosa of the last 12 cm. of the ileum and the first 8 cm. of the colon were replaced by a continuous greenish-grey chronic but sloughy ulcer. The walls of the ileum were thickened to something like five times their normal thickness; the ileo-cæcal valve no longer existed as such, and the fibrous contraction of the base of the ulcer had converted the cæcum into a small sacculus, which barely admitted the tip of one's little finger. The vermiform appendix was not involved in the ulceration. Microscopical sections showed the two layers of muscular coat to be quite intact, but the mucosa and submucosa had become entirely replaced by cellular granulation tissue. The cause of this chronic ulcerative ileo-colitis was not obvious; the only definite points were that no evidence of either tubercle or growth could be found. The kidneys were natural except for anæmic pallor. The lungs were healthy. A piece of the liver, and a piece of the liver of another case (acute tuberculous pleurisy with apparently healthy liver in a girl æt. 14), were kindly analysed by Mr. J. H. Ryffel, who reported as follows:—"The normal liver contained 0.14 per cent. of iron; the pernicious anæmia liver contained 0.34 per cent. of iron. Both are measured for the washed dried solid. The results of both are somewhat high, especially for the normal liver, as I found it impossible to wash the pieces of liver used entirely free from hæmoglobin." The blood counts in the case were as follows:—

| Date. | Red corpuscles, per cub. mm. | Red corpus- cles, per cent. of normal. | Hæmoglobin, per cent. of normal. | Colour index. | Leucocytes per cub. mm. |
|----------------|---------------------------------|--|--|---------------|-------------------------------|
| | Thoma Leitz. | | Haldane. | | Thoma Leitz. |
| 19 June, 1902 | 1,800,000 | 36 | 34 | 0.944 | — |
| 29 " " | 1,800,000 | 36 | 40 | 1.111 | — |
| 5 July, " | 2,500,000 | 50 | 40 | 0.800 | 4,500 |
| 24 March, 1903 | 1,190,625 | 24 | 28 | 1.166 | 5,000 |
| 12 " " | 1,900,000 | 38 | 25 | 0.658 | 5,000 |
| 23 April, " | 1,934,375 | 39 | 27 | 0.692 | 4,375 |
| 28 " " | 1,387,500 | 28 | 36 | 1.285 | 1,666 |
| 11 May, " | 1,865,625 | 37 | 42 | 1.135 | 3,733 |
| 19 " " | 2,125,000 | 42 | 46 | 1.095 | 5,312 |
| 28 " " | 2,075,000 | 41 | 34 | 0.829 | 6,875 |
| 2 June, " | 2,153,125 | 43 | 43 | 1.000 | 9,687 |
| 9 " " | 1,578,125 | 32 | 28 | 0.875 | 6,334 |
| 16 " " | 1,906,250 | 38 | 24 | 0.631 | 3,700 |
| 22 " " | 775,000 | 16 | 22 | 1.375 | 6,300 |
| 6 July, " | 423,000 | 9 | 17 | 1.889 | 2,000 |

Note.—March 21th.—Sp. gr. 1035 (chlorof. and benzene), two normoblasts, and 250 leucocytes. May 1st.—The differential leucocyte count was as follows:—S. 37.5, L. 11.6, P. 49.3, E. 1.6.

The temperature chart was as follows:—



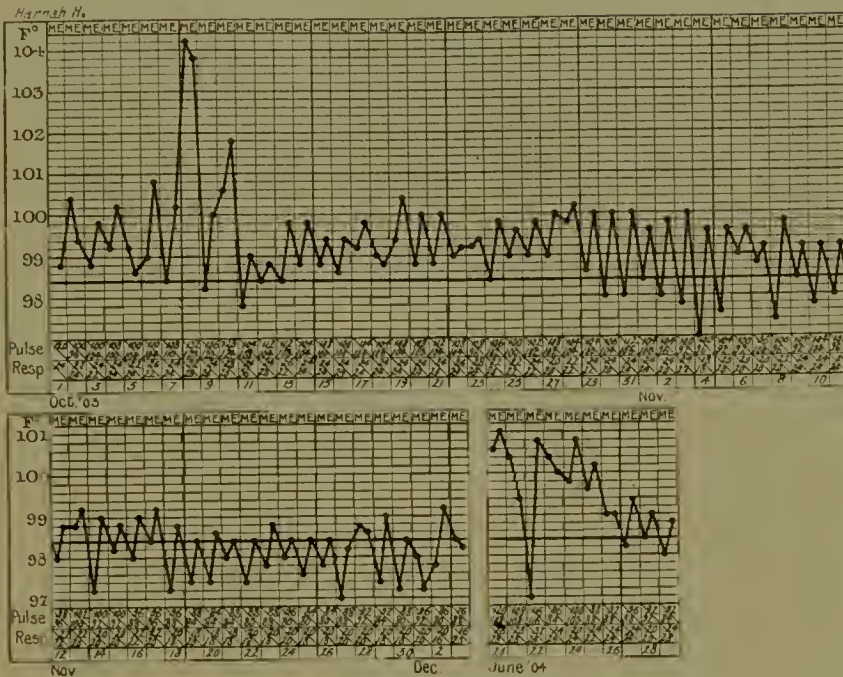
CASE 34.—Ref. No., Vol. 184, No. 632; Vol. 185, No. 260.—Hannah H., æt. 31, a housewife, was admitted under the care of Dr. Hale White on October 1st, 1903, and discharged relieved on December 4th, 1903. She came in for general weakness and for loss of weight of six months' duration, and for vomiting and nausea of three months' duration. For two years past she had been dyspeptic; six months ago, without apparent cause, she began to ail; her menses became scantier each month, and she gradually became weak; she suffered from alternate anorexia and bulimia; headaches and noises in her head came on, and palpitations on the slightest exertion; latterly there had been bleeding per anum, oozing of blood from the gums, and streaks of blood in the vomit. The teeth were much decayed. The face was extremely pallid, and dirty white rather than lemon-yellow. The heart

presented hæmic bruits, and a canter rhythm, though the impulse was in its natural position. The abdomen was thin enough for the liver to be *seen* one and a half inches below the ribs. The spleen was just palpable. The urine contained indican in excess, but no obvious urobilin. Arsenical treatment was adopted, but it was difficult to maintain on account of severe attacks of very foul diarrhœa. Various diagnoses were suggested, but that of pernicious anæmia was finally adopted; the blood counts were typical. Both knee-jerks were extremely brisk, and there was ankle clonus in one foot, but not in the other. The retinæ were natural. The temperature was often 101° F. each night at first, and as improvement took place it only rose to 100° F., and later to less still. After discharge on December 4th, 1903, the patient remained comparatively well for two months. She then began to go back again, the menses decreasing as before, weakness and palpitations increasing, the phlegm becoming streaked with blood, and vomiting taking place after food. She was re-admitted under Dr. Taylor on June 20th, 1904, and re-discharged, again relieved, on July 23rd, 1904. She was extremely pallid on admission, with tenderness of the shafts of the long bones. The liver was felt two and a half inches below the ribs; the spleen was not felt; there was pyrexia as before; the lungs were natural; the heart was of normal size, but presented hæmic bruits in all areas, and there was a bruit de diable in the neck. The urine had a specific gravity of 1015; it contained no albumin. Arsenical treatment led to troublesome diarrhœa, but at the same time the patient's general condition greatly improved. An attempt to trace her since led to a reply from E. Golding, of the same address, on August 15th, 1907:—"Mrs. H. has been dead for over twelve months now;" so apparently she survived her second rally for nearly two years. The blood counts were as follows:—

| Date. | Red corpuscles, per cub. mm. | Red corpus- cles, per cent. of normal. | Hæmoglobin, per cent. of normal. | Colour index. | Leucocytes per cub. mm. |
|---------------|---------------------------------|--|--|---------------|-------------------------------|
| | Thoma Leitz. | | Haldane. | | Thoma Leitz. |
| 1 Oct., 1903 | 987,000 | 19 | 29 | 1.526 | 5,000 |
| 4 " " | 750,000 | 15 | 25 | 1.666 | — |
| 7 " " | 650,000 | 13 | 25 | 1.923 | — |
| 18 " " | 700,000 | 14 | 28 | 2.000 | 5,000 |
| 25 " " | 900,000 | 18 | 28 | 1.555 | — |
| 1 Nov., " | 1,100,000 | 22 | 39 | 1.776 | — |
| 8 " " | 1,100,000 | 22 | 35 | 1.591 | — |
| 14 " " | 1,400,000 | 28 | 39 | 1.393 | — |
| 20 " " | 2,500,000 | 50 | 60 | 1.200 | — |
| 29 " " | 2,500,000 | 50 | 60 | 1.200 | — |
| 22 June, 1904 | 868,750 | 17 | 26 | 1.529 | 7,187 |
| 8 July, " | 2,500,000 | 50 | 58 | 1.160 | — |

Note.—1st October, 1903: Poikilocytes and megalocytes numerous; one nucleated red cell in sixty. 18th October, 1903: Differential leucocyte count practically normal. 22nd June, 1904: S. 54, L. 6, P. 38.5, E. 1.5. Many megalocytes, poikilocytes and nucleated red cells. 8th July, 1904: S. 20, L. 12, P. 60, E. 8.

The temperature chart was as follows:—



CASE 35.—Ref. No., Vol. 184, No. 631; Vol. 185, No. 180; Post-mortem No. 314, 1904.—James R., æt. 47, a cook and painter, was admitted under Dr. Hale White on October 1st, 1903, and was discharged relieved on October 26th, 1903. He was re-admitted on April 28th, 1904, under Dr. Taylor, and he died on July 3rd, 1904. He had enjoyed very good health, except for an attack of jaundice with dark urine, lasting three months, seventeen years ago, until five months before his first admission. The trouble began with shortness of breath on exertion and some swelling of his ankles when he had been up and about. He had had to take to his bed, and he had been very constipated, so that plumbism was the original diagnosis at home, his occupation being that of a painter. He had lost weight, but not bulk. He had several times tried to return to work, but he had found himself quite unable to go on. He was of a decided lemon-yellow tint of face and body, and he was well-covered with fat. The cardiac impulse was slightly displaced to the left, and there was a systolic bruit audible at the impulse only, but deemed to be hæmic. The urine had a specific gravity of 1020, and a dark reddish colour; urobilin could not be detected in the ordinary way even on several examinations of different specimens, and there was neither blood, albumin, nor bile pigment present. The breath was foul, the tongue furred and tooth-marked, and many of the teeth were decayed. There was no blue line on the gums. Constipation was a considerable trouble. Neither liver nor spleen was felt. The lungs, the nervous system, and the fundi oculorum seemed natural. The pulse rate was from 64 to 72, and the respiration rate from 18 to 24. For two weeks the temperature was almost always 99°F. to 100°F. at night;

later on, as improvement set in, the temperature less often exceeded normal. Arsenical treatment was adopted, and the teeth were attended to radically. The patient was discharged greatly relieved and able to walk about, although the condition of the blood did not seem to be greatly bettered. He remained in "good health" until December, 1903, and then he relapsed. He was re-admitted in a similar condition to that in which he was before, except that he now had very tender bones, was constantly sick, and had developed more œdema of the legs and ascites. The urine had a specific gravity of 1032, and a yellow-brown colour, and it was free from urobilin, bile pigments, albumin, and blood as before. The cardiac impulse was now in its normal place, though, as before, there was a local apical systolic bruit. Neither liver nor spleen could be felt. The peritoneal cavity was incised and drained, the ascitic fluid being clear and free from deposit, not spontaneously coagulable, of a pale greenish yellow colour, and specific gravity 1018. It contained 26 parts of albumin per 1,000. Red and white blood corpuscles were found microscopically, but no pus. The pulse rate averaged 68 to 80, and even at death did not exceed 80; the respiration rate averaged 24; the temperature was for the most part 99°F. to 100°F. each night, but once rose to 102·8°F. He died of exhaustion; and at the post-mortem examination it was found that there were fifteen ounces of clear fluid in the left pleural cavity, healed phthisis at the right apex, but otherwise normal lungs. The heart muscle was not unduly pale, and the valves were healthy. There was no pyorrhœa alveolaris. There was general sero-plastic peritonitis without any evidence of tubercles either macroscopically or microscopically. The liver weighed 1,158 grams, and gave a marked Prussian blue reaction. The spleen weighed 105 grams; it was not tested for iron. The kidneys together weighed 260 grams, and gave nearly as marked a blue reaction as did the liver. Analyses were as follows:—

Analyses for Iron:—

| | | | | |
|---------------|-----|-----|-------|--------------------------------|
| <i>Liver</i> | ... | ... | 1·015 | per cent. Fe. in dried tissue. |
| <i>Spleen</i> | ... | ... | 0·335 | " " " |
| <i>Kidney</i> | ... | ... | 0·512 | " " " |

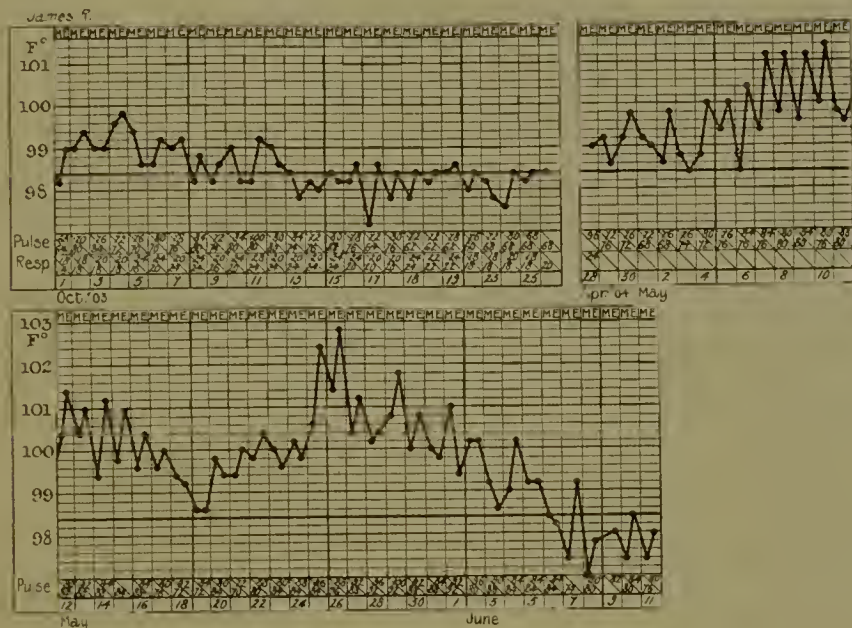
J. H. RYFFEL.

The blood counts were as follows:—

| Date. | Red corpuscles, per cub. mm. | Red corpus- cles, per cent. of normal. | Hæmoglobin, per cent. of normal. | Colour index. | Leucocytes per cub. mm. |
|-----------------|---------------------------------|--|--|---------------|-------------------------------|
| | Thoma Leitz. | | Haldane. | | Thoma Leitz. |
| 1 October, 1903 | 1,560,000 | 31 | 33 | 1·064 | 9,100 |
| 9 " " | 1,560,000 | 31 | 33 | 1·064 | — |
| 16 " " | 1,500,000 | 30 | 35 | 1·166 | — |
| 21 " " | 1,800,000 | 36 | 36 | 1·000 | — |
| 25 " " | 1,800,000 | 36 | 40 | 1·111 | — |
| 30 April, 1904 | 1,393,750 | 28 | 30 | 1·071 | 4,687 |
| 18 May, " | 950,000 | 19 | 32 | 1·684 | 5,625 |
| 4 June, " | 1,520,000 | 30 | 32 | 1·066 | 6,500 |

Note.—October 1st, 1903, Poikiloeytes and megalocytes, but no nucleated red corpuscles. April 30th, 1904, S. 52·8, L. 4·0, P. 42·8, E. 0·4. 12 nucleated red cells in 500 whites. Many poikiloeytes and megalocytes.

The temperature chart was as follows :—



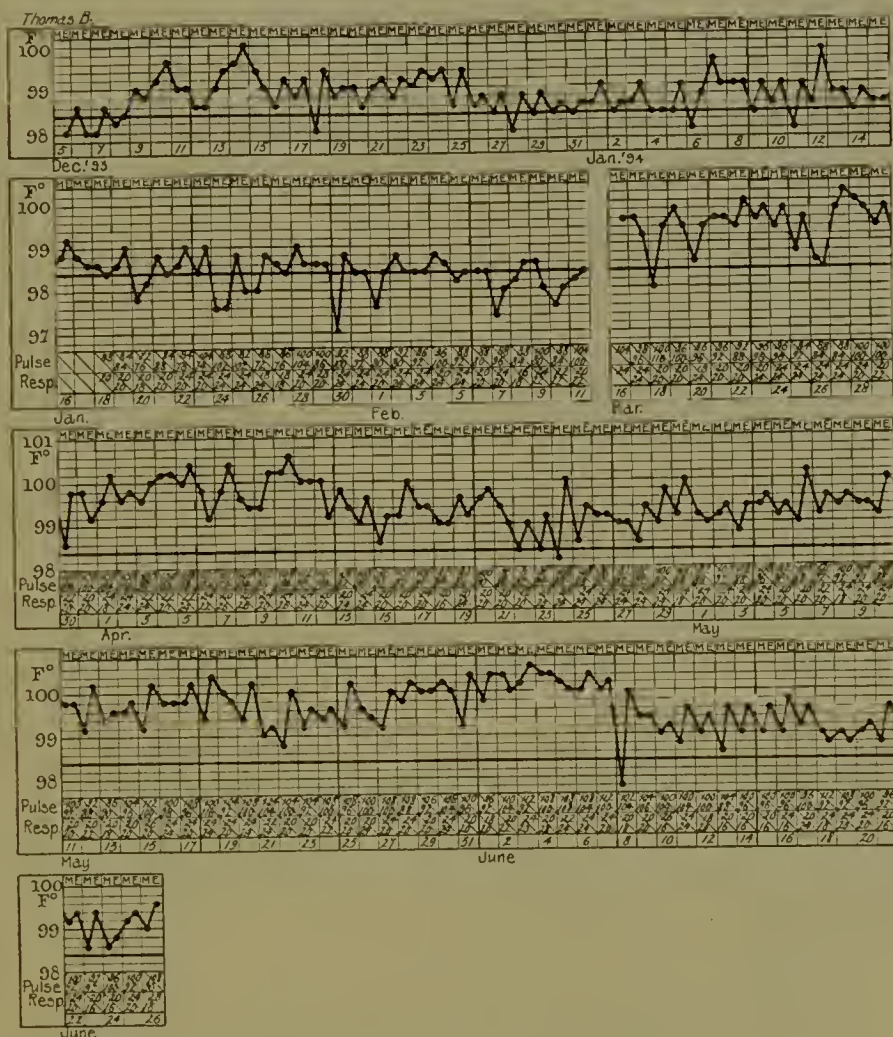
CASE 36.—Ref. No., Vol. 187, No. 19; Vol. 195, No. 162.—Thomas B., æt. 32, an ex-Navy man, was admitted under Sir Cooper Perry on March 16th, 1905, and was discharged much relieved on June 26th, 1905. He gave a long history of illness, and it was very difficult to say at what period the pernicious anæmia originated. In 1889 he entered the Royal Navy as a stoker. In 1892 he contracted syphilis in Alexandria. In 1893 he suffered for three weeks from Malta fever. From 1893 to 1896 he was with the Channel Fleet and in good health, but in 1896 he was invalided from the Navy for varicose veins. Soon after this, in 1896, he began to complain of palpitations, œdema of the ankles, physical weakness, and attacks of severe diarrhœa. He dates his present trouble from this time. In 1899 he was in Canterbury Hospital for these symptoms, and was laid up for sixteen weeks. In 1901 he relapsed, and was again laid up in bed, this time for twenty weeks. In 1903 he had another period in hospital for similar symptoms, but on that occasion he was confined to bed for only two weeks. In 1903-4 he was in Guy's Hospital under Dr. Hale White from December 5th, 1903, to February 11th, 1904, for "anæmia, sclerosis of the cord, electrical treatment," and he was discharged much relieved. There was a hæmic bruit in the pulmonary arch, but no enlargement of the heart. There was fairly severe anæmia, but it was constantly of the chlorotic type at this time. A great many blood counts were made, but unfortunately most of them were lost. The temperature chart was typical. There was a special note, "no pyorrhœa alvolaris." The knee-jerks were exaggerated, there was ankle clonus on both sides, together with extensor plantar reflexes. There was no anæsthesia; but three inches above each ankle on the inner side of each leg there was an area of markedly increased sensibility to heat and cold. The pupils reacted normally. He had electrical

treatment, together with arsenic and iron by the mouth, and was discharged relieved. In 1905 he came under Sir Cooper Perry. The teeth were decayed and very septic. The tongue was bald and fissured. The pupils were natural; but as regards the legs there were indications of lateral sclerosis of the spinal cord as evidenced by ankle clonus on both sides, extensor plantar reflexes, and increased knee-jerks. The hand grips were good, but the legs were weak with slight but definite spastic paraplegia. The urine was orange coloured, of specific gravity 1016; it contained a little albumin and gave an abundant precipitate of urates. The patient's temperature was nearly always 100° F. at least once a day. Treatment with arsenic and iron was followed by considerable relief, and the patient went out relieved. The blood counts varied more than usual, and the diagnosis of pernicious anæmia could not be absolutely maintained, perhaps, in the face of all criticism. Nevertheless the severe anæmia, the high colour index on occasion, if not constantly, and the course of the disease, suggest that pernicious anæmia is at least possible if not probable. Dr. F. W. Young, very kindly writing on September 8th, 1907, says: "Thomas B., was admitted to the Faversham Workhouse Infirmary in June. He was then suffering from profound anæmia. There was no marked wasting, and I was unable to find anything to account for his condition except a blood disease. He had a slight cough with expectoration of watery mucus. There were a few moist sounds in his chest. There was no enlargement of liver or spleen and no albuminuria. His complexion was sallow with a hectic patch on each cheek, and he had slight diarrhœa. I put him on arsenic, but it upset him in even small doses. I am afraid I cannot tell you anything about the condition of his blood. He is extremely weak and is mostly confined to his bed. Since his admission he has steadily gone downhill, and I do not anticipate that he will live many months longer. I do not think that there is much doubt that the man is suffering from pernicious anæmia." The blood counts when in hospital were as follows:—

| Date. | Red corpuscles, per cub. mm. | Red corpus- cles, per cent. of normal. | Hæmoglobin, per cent. of normal. | Colour index. | Leucocytes per cub. mm. |
|-----------------|---------------------------------|--|--|---------------|-------------------------------|
| | Thoma Leitz. | | Haldane. | | Thoma Leitz. |
| 6 Dec., 1903 | 3,500,000 | 70 | 38 | 0.543 | No leuco- |
| 31 " " | 3,000,000 | 60 | 44 | 0.733 | cytosis. |
| 9 January, 1904 | 3,400,000 | 68 | 44 | 0.647 | 10,000 |
| 16 " " | 3,881,250 | 77 | 48 | 0.623 | 3,437 |
| 8 May, 1905 | 1,660,000 | 33 | 28 | 0.848 | 1,980 |
| 6 June, 1905 | 1,150,000 | 23 | 30 | 1.304 | — |

Note.—December 6th, 1903, no nucleated red cells and no obvious poikilocytosis. January 16, 1904, specific gravity of blood 1042; marked micro and megalocytosis, and poikilocytosis. No nucleated red cells seen. S. 48, L. 6, P. 41, E. 5, B. 0, M. 0. May 8th, 1905, S. 47, L. 19, P. 28, E. 4, M. 2. Eight nucleated red cells seen for 100 whites; poikilocytosis and megalocytosis very marked. June 6th, 1905, S. 39, L. 7, P. 80, E. 4.

The temperature chart is as follows:—



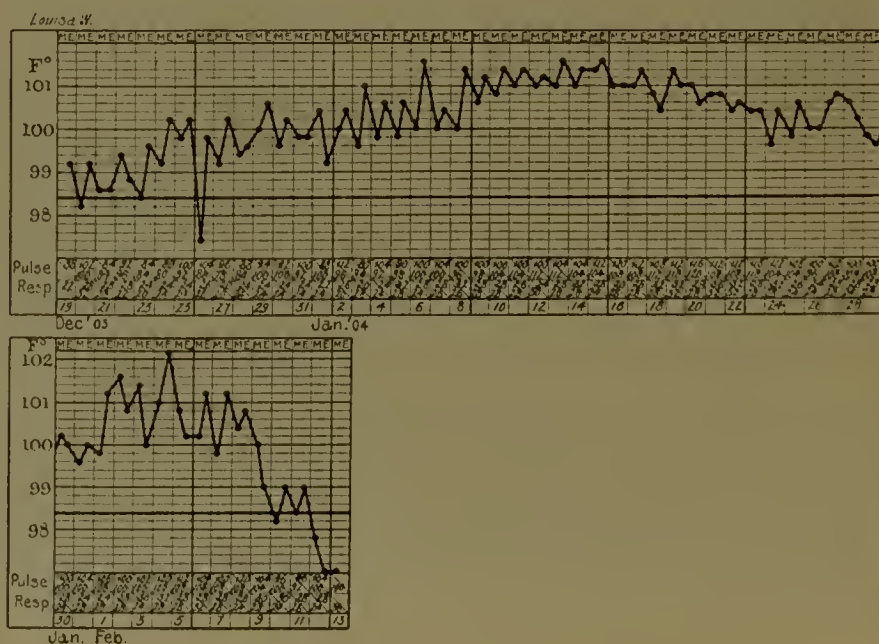
CASE 37.—Ref. No., Vol. 186, No. 35; Post-mortem, No. 87, 1904.—
 Louisa W., æt. 43, a florist, was admitted into Guy's Hospital under the care of Dr. Taylor on December 19th, 1903, and died on February 13th, 1904. She came in for "weakness and vomiting." She stated that she had never been ill until six months previously, when rapidly increasing weakness compelled her to give up her work. She also suffered from pains in the epigastric region and from vomiting, especially after taking food. There had been a moderate degree of epistaxis on several occasions. The catamenia had been regular, but latterly the loss of blood had been considerable each time. The patient was so weak that she could not walk three steps without resting. At the same time she was not emaciated. The liver was palpable, smooth, and decidedly tender. The spleen was palpable two and a half inches below the costal margin. The cardiac impulse was in its normal position; there was a loud hæmic bruit in the pulmonary area, but none at the impulse. The patient's teeth were in particularly good order, and the mouth was clean. The nervous system appeared to be natural. There were

decided hæmorrhoids, and they bled considerably each day. Indeed, the first diagnosis made in the case was that the anæmia was secondary to hæmorrhage from the piles. The blood counts and the post-mortem findings, however, indicated pernicious anæmia. The pulse rate varied from 88 to 108; the respiration rate from 20 to 32; and the temperature chart showed marked evening pyrexia of over 100° F. The urine had a specific gravity of 1010; on one occasion only did it contain albumin; there was no hæmaturia; uric acid crystals were deposited spontaneously. Arsenical treatment was tried, but there was great difficulty in the case owing to vomiting and diarrhœa, both of which became very severe before death. The latter came about by exhaustion. The chief points noted at the post-mortem examination were: That the lungs were healthy; the heart presented much sub-pericardial fat, with obvious fatty changes in the muscle of both ventricles, particularly the left, especially in the musculi papillares, which were marked with characteristic pallid spots and stripes; the liver was large and pale, and gave an even more marked Prussian blue reaction than usual; the spleen was moderately enlarged, and gave a moderate blue reaction, less in degree than that in the liver; the kidneys were pale, and one of them was scarred from former infarcts; they were not tested for Prussian blue reaction. The blood counts were as follows:—

| Date. | Red corpuscles, per cub. mm. | Red corpus- cles, per cent. of normal. | Hæmoglobin, per cent. of normal. | Colour index. | Leucocytes per cub. mm. |
|---------------|---------------------------------|--|--|---------------|-------------------------------|
| | Thoma Leitz. | | Haldane. | | Thoma Leitz. |
| 20 Dec., 1903 | 2,050,000 | 41 | 35 | 0.853 | 8,000 |
| 5 Jan., 1904 | 1,339,000 | 27 | 25 | 0.926 | — |
| 2 Feb. " | 787,500 | 16 | 24 | 1.500 | 6,532 |

Note.—December 20th, S. 27.2, L. 2.4, P. 66.6, E. 3.8. No nucleated red corpuscles in film. February 2nd, Sp. gr. 1021, by the chloroform and benzene method.

The temperature chart was as follows:—

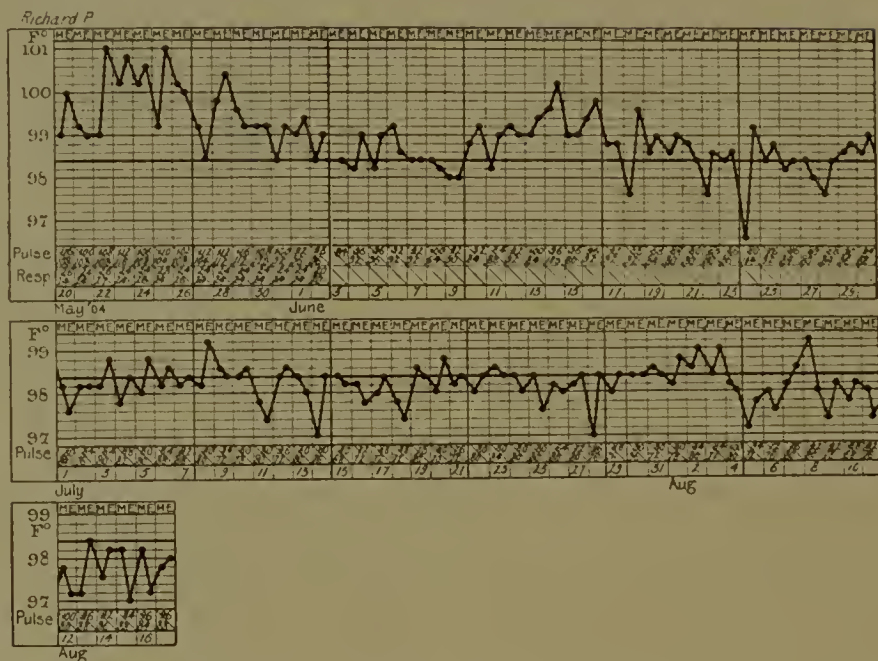


CASE 38.—Ref. Nos., Vol. 186, No. 250, and Vol. 190, No. 334.—Richard P., æt. 48, a joiner, was admitted for general and progressive weakness on May 20th, 1904, and he was discharged relieved on August 16th, 1904. He has not been traced since. He had always lived in England. About two years before his admission he noticed that he was unable to do his work so quickly as usual, and that he was losing power in his hands, arms, and legs. He gradually got so weak that in the end he had to take to his bed. He recovered sufficiently to be able to return to work, only to relapse again in a short while, and be again compelled to stop in bed. Ultimately he noticed that he was getting much paler, and that he was losing in weight, but not in flesh. Lately he had lost control over his defæcation. His bowels had been loose ever since he could remember, and lately, in addition to this, there had been frequent vomiting. His teeth had all been removed years previously. The vomited material contained no blood. The patient also complained considerably of pains in his head and of noises in his ears. On admission he was a very pale yellow colour. The lungs were natural. The heart was not dilated, but there was a well-marked hæmic bruit both in the pulmonary area and at the impulse, and there was a venous hum in the neck. The urine was dark, and had a specific gravity of 1016; urobilin was present, but neither albumin nor blood were found. The knee-jerks were natural. The plantar reflexes were flexor. The only hæmorrhages noted were in the eyes, fair numbers of retinal hæmorrhages being seen. The temperature chart showed a typical rise every night to 99° F., 100° F., or 101° F. The pulse rate averaged from 104 to 116, and the respiration rate 20 to 24. The patient continued to improve considerably under arsenical treatment, but finally there was a severe relapse whilst treatment was still being continued. Dr. Boycott found that the patient's blood was not hæmolytic to the blood corpuscles of any one of three healthy men. At one time there was much pain in the throat, and the patient also complained sometimes of stiffness of his knee-joints when he moved them. He went out less well than he had been during the middle part of his stay in the hospital, but his subsequent history could not be traced. The blood counts were as follows:—

| Date. | Red corpuscles, per cub. mm. | Red corpus- cles, per cent. of normal. | Hæmoglobin, per cent. of normal. | Colour index | Leucocytes per cub. mm. |
|--------------|---------------------------------|--|--|--------------|---------------------------------------|
| 20 May, 1904 | Thoma Leitz. 780,000 | 15·6 | Haldane. 18·6 | 1·154 | Thoma Leitz. No leuco- cytosis. |
| 4 June | 3,310,250 | 60 | 40 | 0·666 | 6,250 |
| 7 " | 2,418,750 | 48 | 38 | 0·800 | — |
| 11 " | 3,336,000 | 67 | 68 | 1·015 | 6,050 |
| 20 July | 3,030,000 | 61 | 72 | 1·180 | 6,187 |
| 29 " | 3,000,000 | 60 | 76 | 1·266 | 9,375 |
| 12 Aug. | 2,520,000 | 50 | 32 | 0·640 | 5,312 |

Note.—May 20th, 1904. Nucleated red corpuscles numerous. Megalocytosis not very well marked. Poikilocytosis well marked.

The temperature chart was as follows:—



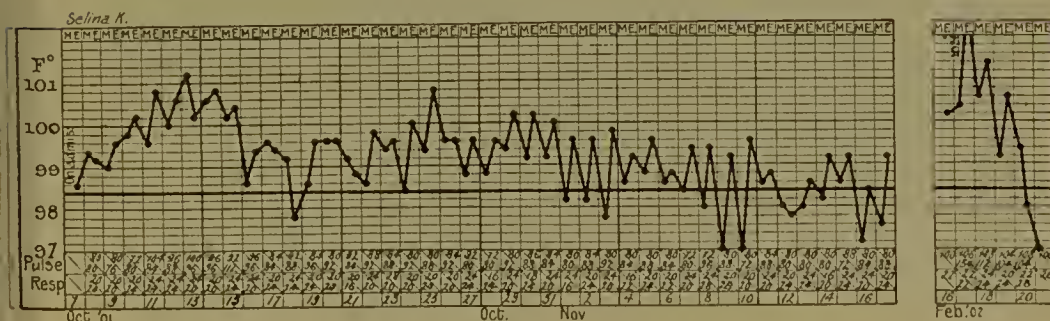
CASE 39.—Ref. Nos., Vol. 170, No. 81; Vol. 175, No. 51; Post-mortem No. 83, 1902.—Selina K., æt. 41, a married woman, was in hospital under Dr. Hale White, from March 22nd to May 10th, 1901, again from October 7th to December 8th, 1901, and again from February 16th, 1902, to February 21st, 1902, when she died. She was originally admitted for cold shivers, pains over her heart, breathlessness, and vomiting. She had been a strong woman, and had had six children, the youngest of whom was then aged five. She stated that she had been quite well until seven years previous to her admission, when her health began, as she stated, to break up as the result, she thought, of the defective sanitary arrangements of her house. She used often to be sick, and frequently had to stay in bed on account of her weakness. She had been in bed continuously for five months before her admission, and her languidity had been quite bad for over two years before that, during which time there had been constant vomiting after food. She had been attending the Out-patient Department at the hospital for a time, but a year before her first admission she became too weak to continue attending. When seen in bed she was of the typical lemon colour, and she was a very thin woman. Her pulse rate was 72, and her respiration rate 20. Her temperature often reached 100°F. in an evening, sometimes even to 101°F., though it did not always exceed 99°F. The heart was of normal size, but there were hæmic bruits at the impulse, at the base, and over the veins in the neck. The bowels acted regularly. The teeth were in a bad state, but she said this had only been since she had been taking medicine. The urine often contained uric acid crystals in the deposit; no urobilin was detected on the one occasion on which it was tested for. The nervous system seemed natural. There was nothing abnormal on ophthalmoscopic examination. At one time there were subcutaneous petechiæ. Treatment

was by means of arsenic and by anti-streptococcal serum. Improvement was considerable, and the patient was discharged able to do her housework. Two months later, however, she relapsed, and shortly after that was re-admitted in a very anæmic state. She was again relieved and discharged in December, 1901, and continued well for one month, then gradually became less well, and, finally, acutely worse. On her last admission she exhibited retinal hæmorrhages and severe diarrhœa, the result of ulcerative colitis. Saline infusion was resorted to, but she died in a few days. Shortly before her death she was unconscious and delirious. The lungs were œdematous, but otherwise natural. The heart weighed 336 grams, and its valves were normal. Its cavities were not dilated, but the muscle was pale and exhibited marked tabby-cat striation, especially in the musculi papillares. The liver was of soft consistence, and a pale buff yellow colour, and it gave a very marked iron reaction. The spleen weighed 221 grams. The kidneys weighed 392 grams, and they were large and pale. There was no iron reaction in either kidneys or spleen. The intestines had very thick walls throughout, and on the inner surface of the colon there was a granular and firmly adherent deposit of exudation in small and large patches, the exudate in one place being continuous for 40 centimetres. The condition was one of acute exudative colitis, which had not yet reached the state of ulceration. It was regarded by Dr. Fawcett as secondary and terminal. The bone marrow of the femur was dark red, and microscopically it exhibited many nucleated red cells. The blood counts were as follows:—

| Date. | Red corpuscles, per cub. mm. | Red corpus- cles, per cent. of normal. | Hæmoglobin, per cent. of normal. | Colour index | Leucocytes per cub. mm. |
|----------------|---------------------------------|--|--|--------------|-------------------------------|
| | Thoma Leitz. | | Haldane. | | Thoma Leitz |
| 22 March, 1901 | 800,000 | 16 | 14 | 0.875 | 5,000 |
| 6 April, " | 1,280,000 | 26 | — | — | 9,600 |
| 7 May, " | 4,333,340 | 86 | 30 | — | 14,000 |
| 7 October, " | 703,000 | 14 | 20 | 1.428 | 5,200 |
| 16 " " | 1,050,000 | 21 | 15 | 0.714 | 6,000 |
| 25 " " | 1,200,000 | 24 | 26 | 1.083 | 3,500 |
| 9 Nov., " | 2,000,000 | 40 | 31 | 0.775 | 3,800 |
| 26 " " | 2,500,000 | 50 | 50 | 1.000 | 2,500 |

Note.—March 22nd, poikilocytosis and megalocytosis were well marked. Several nucleated red corpuscles were seen in the films. October 7th, poikilocytosis and megalocytosis still well marked, but nucleated red corpuscles no longer seen.

The temperature chart was as follows:—

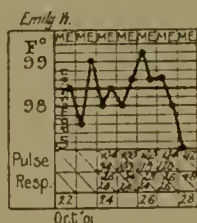


CASE 40.—Ref. No., Vol. 173, No. 600; Post-mortem No. 387, 1901.—Emily W., æt. 51, a fish-shop keeper, was admitted for weakness, anæmia, and hæmorrhages under the skin, on October 22nd, 1901, and she died on October 28th, 1901. She had been subject to severe “bilious attacks and headache” for eight or ten years, and then, a year before her admission, she complained of being so short of breath whenever she tried to do anything requiring exertion. About the same time she began to be weak, and weakness and pallor had progressively increased throughout the year. Three weeks before admission she had suffered from successive crops of subcutaneous petechiæ. On admission there was a very extensive purpura all over her body, but at the same time the lemon-yellow colour of pernicious anæmia was typical. The pulse rate was 96, and the respiration rate 28. Neither spleen nor liver could be felt. Epistaxis occurred, and was succeeded by hæmatemesis, and the patient sank first into an apathy and then a coma, and died. At the autopsy the liver gave a marked Prussian blue reaction; the spleen was very small; the heart exhibited both tabby-cat striation and petechial hæmorrhages, and the stomach and intestines presented a dark greyish look internally as though from altered blood extravasated in the sub-mucosa. The blood count was as follows:—

| Date. | Red corpuscles, per cub. mm. | Red corpus- cles, per cent. of normal. | Hæmoglobin, per cent. of normal. | Colour index | Leucocytes per cub. mm. |
|------------------|---------------------------------|--|--|--------------|-------------------------------|
| 23 October, 1901 | Thoma Zeiss. 550,000 | 11 | Haldane. 20 | 1·818 | — |

Note.—Sp. gr. 1037. Poikilocytosis not marked. No obvious nucleated red corpuscles in stained films.

The temperature chart was as follows:—



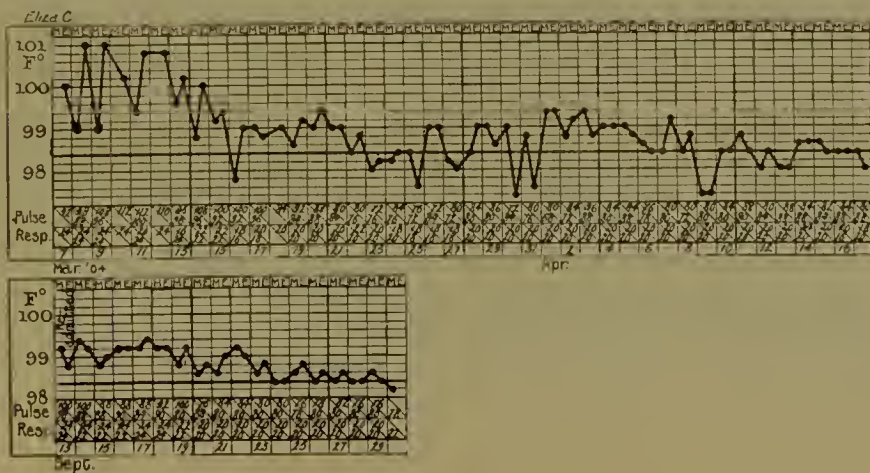
CASE 41.—Ref. No., Vol. 186, No. 145.—Eliza C., æt. 37, a housewife, was under the care of Dr. Taylor from March 7th, 1904, to April 18th, 1904, and again from September 13th, 1904, to October 1st, 1904. She came in for general weakness, anæmia, and loss of weight. At first she weighed 8-st. 13lbs., and later rose to 9-st. 5lbs. She was a married woman who had had eight children, and whose husband was alive and well. She had been born in Poplar, and had always lived in London. Eight years before admission she had small-pox; in April, 1903, she had an obscure illness, which was regarded as typhoid fever, but this apparently formed a part of her present malady, which started in the spring of 1902, at which time she began to change to the colour she now is, and was so short of breath on exertion that she could not run upstairs. At the time of her “typhoid fever,” whose main symptoms were diarrhœa and pyrexia, she was in bed six weeks; her weight just before this had been 13st. In December, 1903, she was again in bed for three weeks with a similar obscure illness. In the

middle of February, 1904, she suffered from severe diarrhœa continuously for a fortnight, without apparent cause. Throughout the two years previous to her admission she had been repeatedly subject to slight attacks of diarrhœa alternating with constipation, and there had been buzzing noises at the back of her head, fits of retching, occasional epistaxis, and often so much pain over the epigastrium that she was compelled to keep the weight of the bedclothes off that region. She presented the typical lemon-yellow waxy-looking skin. She was well covered with fat all over. The heart was a little dilated, the impulse being in the fifth left intercostal space in the nipple line. There was a hæmic bruit audible in the mitral, aortic, and pulmonary areas, and a bruit de diable in the neck. The spleen could just be felt. The liver was not palpable. The temperature chart was typical; the pulse rate averaged 92 and the respiration rate 24. There were retinal hæmorrhages. The nervous system was natural. The urine was acid, and contained no albumin, blood, sugar, or pus. Arsenical treatment brought speedy improvement, and on April 18th she felt better than she had done for two years. She kept well till June, and then the old symptoms returned. She was re-admitted, and again improved. The temperature was again slightly raised each day. On August 18th, 1907, the husband writes:—"My wife, Eliza C., died on August 9th, 1905." It is noteworthy that the teeth and mouth in this case were in remarkably good order. The blood counts were as follows:—

| Date. | Red corpuscles, per cub. mm. | Red corpus- cles, per cent. of normal. | Hæmoglobin, per cent. of normal. | Colour index. | Leucocytes per cub. mm. |
|---------------|---------------------------------|--|--|---------------|-------------------------------|
| 9 March, 1904 | Thoma Leitz. 1,112,500 | 22 | Haldane. 33 | 1.500 | Thoma Leitz 7,000 |
| 26 " " | 3,850,000 | 77 | 51 | 0.662 | 8,750 |
| 29 " " | 2,590,000 | 52 | 47 | 0.904 | — |
| 15 Sept., " | 1,500,000 | 30 | 50 | 1.666 | — |
| 30 " " | 2,100,000 | 42 | 54 | 1.286 | — |

Note.—March 9th: To each 100 whites there were 22 normoblasts and 1 megaloblast. Poikilocytes and megalocytes abundant. S. 28, L. 4, P. 68, E. 0. March 22nd: S. 41, L. 9, P. 45, E. 5. For each 100 leucocytes there were 1 normoblast, 3 megaloblasts, 1 giantoblast, 0 microblast. September 15th: S. and L. 35, P. 64, E. 1.

The temperature chart was as follows:—

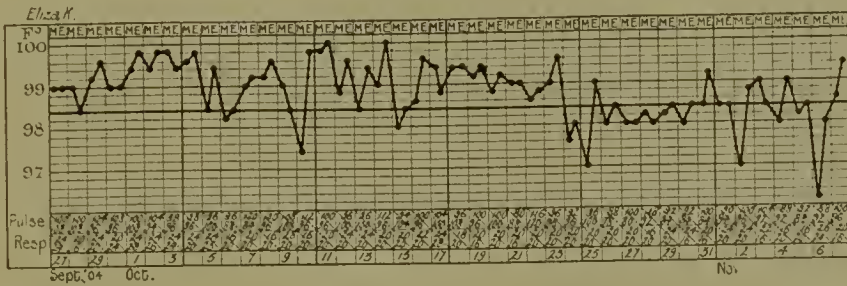


CASE 42.—Ref. No., Vol. 187, No. 402.—Eliza K., æt. 47, a married woman, was in Guy's Hospital from the 27th September, 1904, to the 8th November, 1904, when she was discharged somewhat relieved. Although not much better on her discharge than on her admission, she lived for over a year longer, her daughter writing in August, 1907, as follows:—"My mother, Mrs. K., died in January, 1906. After leaving Guy's Hospital in 1904, she kept fairly well till the following March, when she failed again, and our doctor told us she could not possibly recover; but she rallied again after being in bed for three months, and got fairly well until the following January, when she failed again, and after being in bed only a fortnight she passed away rather suddenly in her sleep; our doctor told me it was from exhaustion, as she had got very weak. Although able to get about between attacks, she was rarely out of the doctor's hands, and never able to do much of her house-work; she was in her 49th year." She was admitted in 1904 complaining chiefly of pains in the epigastric region, and of dyspnœa. She was married and had had seven daughters. She had had anæmia for a long time, and had been under treatment for it for two years, whilst at the same time she was recorded as suffering from enteroptosis. Till May, 1904, she was usually constipated, since when her bowels had shown a tendency to looseness, perhaps as the result of arsenical treatment. In May, 1904, she became particularly short of breath, and though she had not diminished in bulk to a marked degree, she had lost weight. She came into the hospital because she was getting worse. On admission, she did not look particularly wasted, but she was extremely pale and bloodless. There was divarication of the abdominal recti muscles with consequent visible peristalsis. The spleen and both kidneys could be felt, but the liver did not come below the costal margin. The heart was of natural size, but exhibited hæmic bruits. The condition of the optic discs and of the urine is not noted. The temperature chart was typical, going up to 99° or 100° F. each night at first, whilst towards the end of her stay in hospital less rise was noted. Treatment was by means of arsenic. On October 18th, there was a transient attack of herpes labialis. There was nothing in the nervous system to attract particular attention. The blood count was as follows:—

| Date. | Red corpuscles, per cub. mm. | Red corpus- cles, per cent. of normal. | Hæmoglobin, per cent. of normal. | Colour index. | Leucocytes per cub. mm. |
|-----------|---------------------------------|--|--|---------------|-------------------------------|
| | Thoma Leitz. | | Haldane. | | Thoma Leitz. |
| 3 October | 1,800,000 | 36 | 42 | 1.166 | 5,937 |
| 4 " | 2,350,000 | 47 | 48 | 1.021 | 5,000 |
| 18 " | 1,600,000 | 32 | 39 | 1.219 | — |

Note.—On October 4th, the differential leucocyte count was as follows:—S. 53 per cent., L. 2 per cent., B. 45 per cent., E. 0 per cent. In films two large nucleated red corpuscles were seen in counting each 100 leucocytes.

The temperature chart was as follows :—

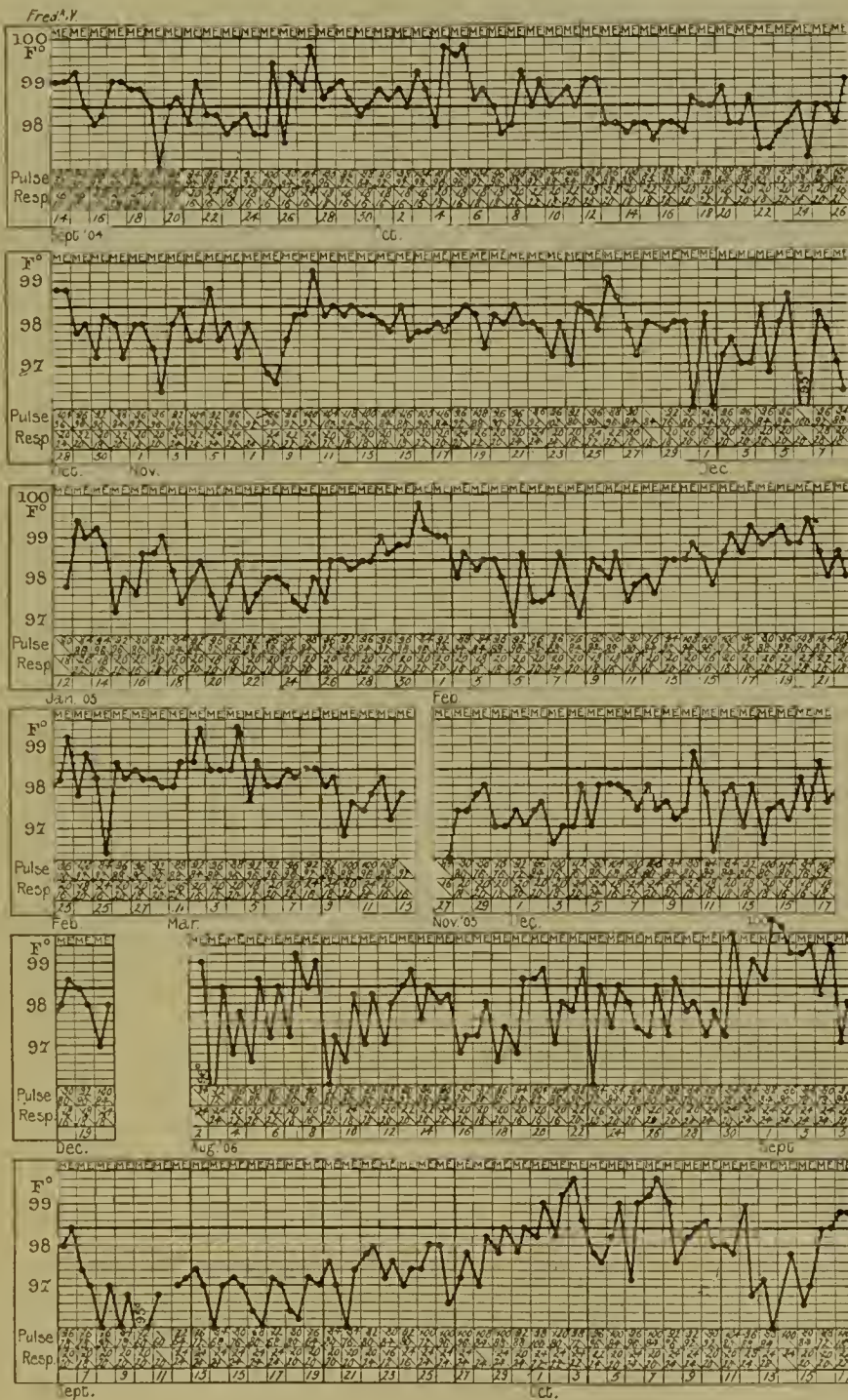


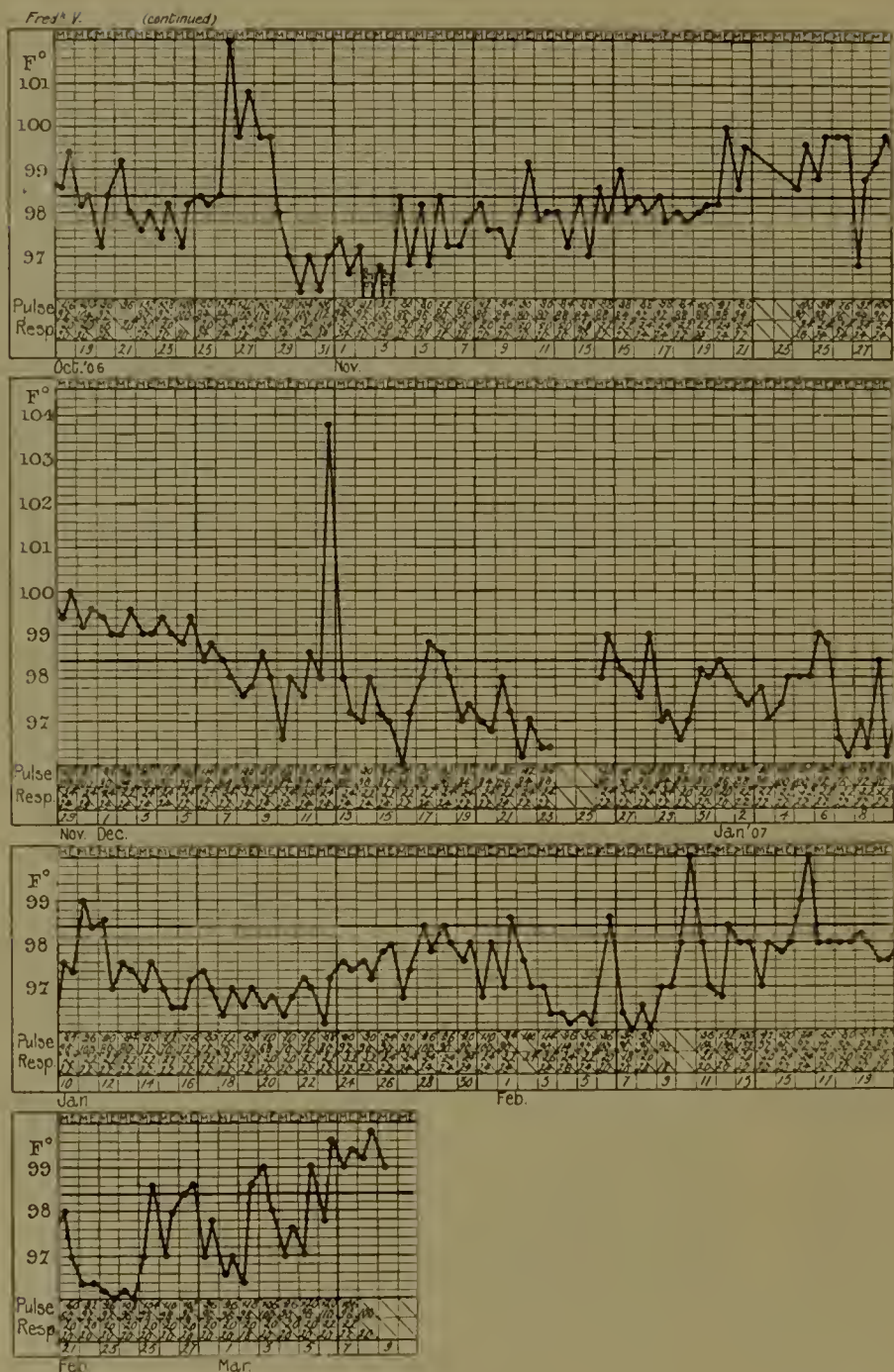
CASE 43.—Ref. Nos., Vol. 187, No. 319; Vol. 193, No. 491; Vol. 195, No. 72; Vol. 205, No. 225.—Frederick V., æt. 22, a shoemaker, first came under the care of Dr. Hale White from August 2nd to December 15th, 1904. There was a long and indefinite history of increasing weakness and unfitness for work, and upon examination the chief thing that attracted attention was the colour of the skin. The man was not emaciated, though tall and spare. The lips were pale, but the skin of the face, instead of being primrose or lemon yellow, had an unhealthy sallow tint, and upon closer inspection it became clear that there was an abnormal pigmentation both of the face and all over the limbs and trunk, partly in small dark-brown freckle-like spots, and partly in more diffuse brown areas. Addison's disease at once suggested itself as a diagnosis, and at first sight this seemed to be confirmed by the presence of well-marked pigmented streaks and spots within the mouth, particularly on the inner aspect of the cheeks, precisely like that which occurs in Addison's disease. The difficulty in diagnosis was rendered greater by the variation in the colour index of the blood, which was sometimes low and sometimes high. Dr. Hale White laid much more stress upon the high colour indices than upon the low ones, and his diagnosis of pernicious anæmia was confirmed by post-mortem examination in 1907, when the Prussian blue reaction in the liver was typical, and the supra-renal capsules were natural. The heart was of normal size, but there were well-marked hæmic bruits at the impulse and in the aortic and pulmonary areas. Neither liver nor spleen could be felt. The urine had a specific gravity of 1012, was acid in reaction, contained neither albumin nor blood, and only occasionally gave a urobilin band. There was evidence in this patient of degeneration in the spinal cord, for the plantar reflex on each side was persistently extensor, and there was a peculiarity in the man's sensations in the legs, in that whereas he could feel well enough to distinguish heat from cold, and pain from touch, he was insensible to the sensations usually caused by strong electrical shocks over considerable areas both above and below the knees. On many occasions there was blood in the motions, but no other hæmorrhage. The ophthalmoscopic examination showed no retinal changes. Towards the end acute pleurisy developed and the patient was a good deal troubled with œdema of his legs. The pulse rate varied from 80 to 100, the respiration rate from 18 to 24, and the temperature chart was not so typical as some, though it rose more or less in the evening, upon a good many occasions to between 99° F. and 100° F. Treatment was by means of arsenic for the most part, in addition to which on various occasions suprarenal extract, iron, and bone-

marrow were administered. He rallied to a certain extent in 1904, but was again in the hospital in 1905, both under Dr. Hale White and under Sir Cooper Perry. Though his improvement was not objectively great, he survived till 1907, dying in an infirmary on March 21st, 1907. The blood counts were as follows:—

| Date. | Red corpuscles, per cub. mm. | Red corpus- cles, per cent. of normal. | Hæmoglobin, per cent. of normal. | Colour index. | Leucocytes per cub. mm. |
|---------------|---------------------------------|--|--|---------------|-------------------------------|
| | Thoma Leitz. | | Haldane. | | |
| 5 Aug., 1904 | 2,100,000 | 42 | 44 | 1·047 | 2,400 |
| 24 " " | 2,625,000 | 52 | 36 | 0·692 | — |
| 3 Sept., " | 2,260,000 | 45 | 36 | 0·800 | — |
| 6 " " | 2,470,000 | 49 | 34 | 0·694 | 3,125 |
| 3 Oct., " | 1,450,000 | 29 | 37 | 1·276 | 2,656 |
| 14 " " | 2,060,000 | 41 | 34 | 0·829 | 2,188 |
| 20 " " | 1,350,000 | 27 | 34 | 1·259 | 2,810 |
| 28 " " | 1,760,000 | 35 | 35 | 1·000 | 2,030 |
| 12 Nov., " | 1,650,000 | 33 | 36 | 1·091 | 1,800 |
| 20 " " | 1,650,000 | 33 | 36 | 1·091 | 2,500 |
| 1 Dec., " | 1,650,000 | 33 | 36 | 1·091 | 1,500 |
| 10 " " | 2,200,000 | 44 | 37 | 0·841 | 2,000 |
| 20 Jan., 1905 | 1,731,250 | 35 | 36 | 1·029 | — |
| 3 Feb., " | 1,350,000 | 27 | 27 | 1·000 | 1,250 |
| 2 Dec., " | 1,750,000 | 35 | 45 | 1·286 | 1,800 |
| 14 " " | 1,750,000 | 35 | 26 | 0·743 | 4,375 |
| 3 Aug., 1906 | 2,150,000 | 43 | 44 | 1·023 | 6,850 |
| 24 " " | 2,100,000 | 42 | 44 | 1·047 | 6,700 |
| 10 Sept., " | 2,280,000 | 46 | 46 | 1·000 | 5,000 |
| 17 Oct., " | 950,000 | 19 | 22 | 1·158 | 3,400 |
| 9 Nov., " | 2,533,333 | 51 | — | — | 7,812 |
| 16 " " | 2,333,333 | 47 | 30 | 0·638 | 7,500 |
| 29 Jan., 1907 | 2,500,000 | 50 | — | — | 5,800 |

Note.—On February 3rd, 1905, seven nucleated red cells seen in counting 100 white cells. The differential leucocyte count was as follows: S. 68 per cent., L. 2 per cent., P. 27 per cent., E. 3 per cent. August 3rd, 1906: Films showed poikilocytes, microcytes and megalocytes, and one or two normoblasts. Numbness in the legs now very marked. September 10th: Poikilocytosis well marked; no nucleated red cells seen. November 9th: The patient was taken to the strong room, not so much for delirium as for general violence and foulness of language. November 16th: Pleurisy developed in left side. November 27th: Aspiration of chest was performed. August 5th, 1904: Poikilocytes well marked; necrobiosis of red cells; megalocytes very numerous; no nucleated red corpuscles; no retinal hæmorrhages. August 24th: Films again showed great numbers of microcytes, megalocytes and poikilocytes; no nucleated red corpuscles. September 3rd: Nucleated red corpuscles present in films to-day. September 6th: Films as before; differential leucocyte count as follows: S. 58, L. 4, P. 33, E. 5; in counting 500 white corpuscles, 5 normoblasts, and 2 megaloblasts were seen. September 13th: S. 49, L. 3, P. 46, E. 2; it was noted on this day that the teeth were in particularly good condition. October 3rd: S. 62, L. 2, P. 32, E. 4; in counting 400 leucocytes, 6 normoblasts, 38 megaloblasts, and 1 giantoblast





were seen; punctate basophilia was very marked. October 14th: Films showed many poikilocytes, punctate basophilia less marked; megalocytes were very numerous, however, and nucleated red cells seen; differential leucocyte count as follows: S. and L. 68, P. 27, E. 5; three megaloblasts were seen while counting 200 leucocytes. October 20th: Differential leucocyte count as follows: S. 73, L. 2, P. 23, E. 2; five megalocytes and two megaloblasts seen while counting 200 leucocytes. Urobilin in the urine was estimated on the 20th, October at 0.008 g. and 0.10 g. on the 21st. October 28th: Differential leucocyte count as follows: S. and L. 58, P. 38, E. 4; poikilocytes

still marked, but no nucleated red cells seen, and no punctate basophilia. November 12th: Films as before, differential leucocyte count as follows: S. 70, L. 1, P. 25, E. 4. November 20th: Differential leucocyte count as follows: S. 67, L. 0, P. 31, E. 2; no nucleated red cells seen; sodium cinnamate was now given to see if leucocytosis could be produced; treatment for some time past had been by red bone marrow, which had been no good at all. November 21st: Ten grains of sodium cinnamate given hypodermically. November 22nd: Ten grains more. December 1st: Films were similar to what they had been before, and no nucleated red corpuscles present; collargol given intravenously; leucocytes did not increase. December 10th: Urobilin: total amount December 1st: 0.076 grains. December 4th: 0.176. December 8th: 0.140.

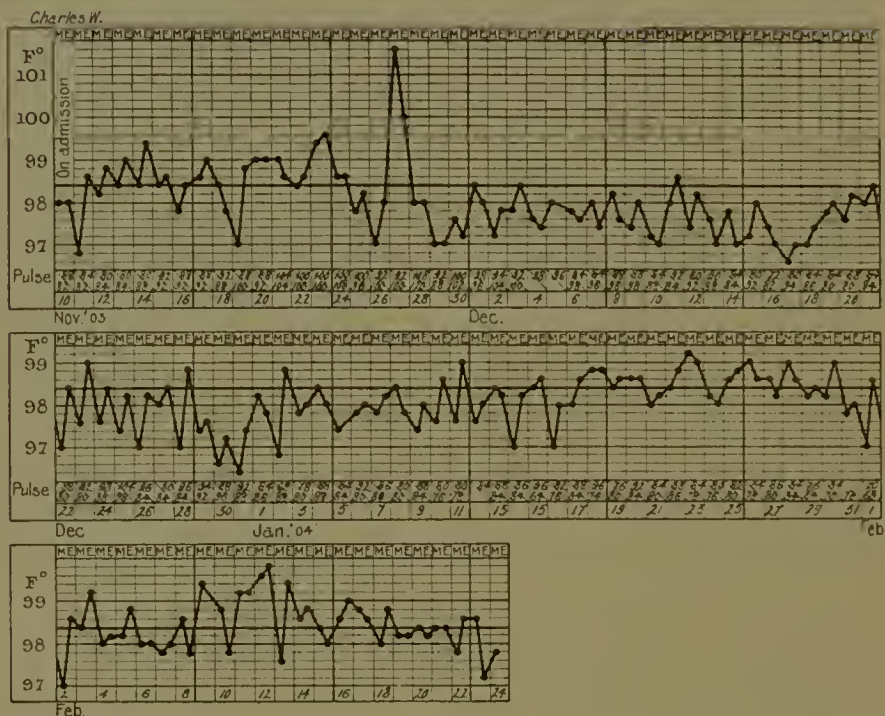
For temperature charts, see pages 175 and 176.

CASE 44.—Ref. No., Vol. 188, No. 45.—Charles W., æt. 65, a foreman in a coal-tar products factory. Admitted under Dr. Pitt on November 10th, 1903, and discharged relieved on February 24th, 1904. His main symptoms were weakness and shortness of breath. He stated that his health had been perfectly good until October 2nd, 1902, on which day he fell ill of a malady which was diagnosed as bronchitis and pleurisy at the time; since then he had never been well, though he had tried to keep on at his work. The shortness of wind had been particularly marked for six months previous to admission, and for eight months he had been greatly troubled by numbness in both hands and both feet. After being about there would be œdema of the ankles, but there was none when he stopped in bed. Vomiting, especially after food, had been frequent during the last few months. The bowels had been constipated. Three weeks before admission there had been a little blood with the motions and after them, attributed to piles. The chief points of the case were: The typical yellow colour, tenderness of the bones of the legs, a pulse rate varying from 86 to 100, a temperature chart which often reached 99° F., but seldom exceeded it; a liver which was just palpable, though the spleen was not; hæmic bruits both at the impulse and at the base of the heart; a normal position of cardiac impulse; considerable purpura upon the legs at one time; normal knee-jerks and other reflexes. Good clean teeth and mouth. Urine dark orange, of specific gravity 1014, and free from albumin and blood. Weight of patient 9st. 10lbs., rising to 10st. 2lbs. Other points, such as optic discs and retinae, urobilinuria, etc., are not mentioned. The patient went out relieved, but it was ascertained that he soon relapsed, and died on December 7th, 1904. The blood counts were as follows:—

| Date. | Red corpuscles, per cub. mm. | Red corpus- cles, per cent. of normal. | Hæmoglobin, per cent. of normal. | Colour index. | Leucocytes per cub. mm. |
|---------------|---------------------------------|--|--|---------------|-------------------------------|
| | Thoma Leitz. | | Haldane. | | Thoma Leitz. |
| 12 Nov., 1903 | 2,133,000 | 43 | 45 | 1.047 | 5,625 |
| 24 " " | 1,968,700 | 39 | 36 | 0.923 | — |
| 12 Dec., " | 2,475,000 | 49 | 50 | 1.020 | 5,937 |
| 13 Jan., 1904 | 2,583,333 | 52 | 50 | 0.961 | 7,500 |
| 17 Feb., " | 2,950,000 | 59 | 57 | 0.966 | 11,875 |

Note.—November 12th, specific gravity of blood 1040 (chloroform and benzene). S. 51.6, L. 0.8, P. 39.6, E. 8.0. Poikilocytes and megalocytes plentiful. Eight normoblasts and 1 megaloblast to each 250 leucocytes.

The temperature chart was as follows:—



CASE 45.—Ref. No., Vol. 192, No. 56.—Fanny B., æt. 39, spinster, was admitted under Dr. Taylor on December 5th, 1904, and was discharged greatly relieved on January 23rd, 1905. She came in for weakness and loss of appetite. She was born in Dublin, and had had diphtheria at nine years of age, since when she had had exuberant good health until 1903, when her left leg was amputated above the knee for gangrene of the foot, due to arteritis and thrombosis, the cause of which at so early an age was not obvious. She remained quite well after the operation, getting about on crutches, until September, 1904. She then developed a very septic sore throat and extreme diarrhœa that lasted a week, attributed to a bad smell from drains. After this she remained very weak, and every little thing made her vomit. She had the typical lemon-yellow skin, and later developed the salmon-pink flush over the cheeks which is frequent in cases recovering from pernicious anæmia. She was decidedly plump, and although so anæmic she was still vivacious when resting in bed, though she was too weak to walk across the room. There were no retinal nor other hæmorrhages. The heart was of natural size, and there was a systolic bruit in the pulmonary area and a bruit de diable in the neck. Neither liver nor spleen was palpable. The urine had a specific gravity of 1018; it contained neither albumin nor blood nor pus, no bile salts and no urobilin to the spectroscopic test. The reflexes were natural. Pulse rate and respiration rate were somewhat above normal, and the temperature was often 99°F. to 100°F. at night. Arsenical treatment led to a remarkable degree of recuperation; but attempts to trace the patient

since she left the hospital have failed. The blood counts were as follows:—

| Date. | Red corpuscles, per cub. mm. | Red corpus- cles, per cent. of normal. | Hæmoglobin, per cent. of normal. | Colour index. | Leucocytes per cub. mm. |
|--------------|---------------------------------|--|--|---------------|-------------------------------|
| | Thoma Leitz. | | Haldane. | | Thoma Leitz. |
| 6 Dec., 1904 | 1,000,000 | 20 | 35 | 1·750 | 6,875 |
| 14 " " | 1,462,500 | 29 | 48 | 1·655 | No leuco- cytosis. |
| 4 Jan., 1905 | 4,300,000 | 86 | 68 | 0·791 | 7,812 |
| 11 " " | 3,600,000 | 72 | 60 | 0·833 | — |
| 19 " " | 5,600,000 | 112 | 98 | 0·875 | — |

Note.—6th December, 1904: S. 31, L. 14, P. 52, E. 3; many poikilocytes and megalocytes, and 16 nucleated red cells (normoblasts or megaloblasts) to every 100 white cells = 1,100 per cub. mm. 14th: S. 33, L. 14, P. 50, E. 3; 5 nucleated red cells to 100 whites.

No temperature chart is available in this case.

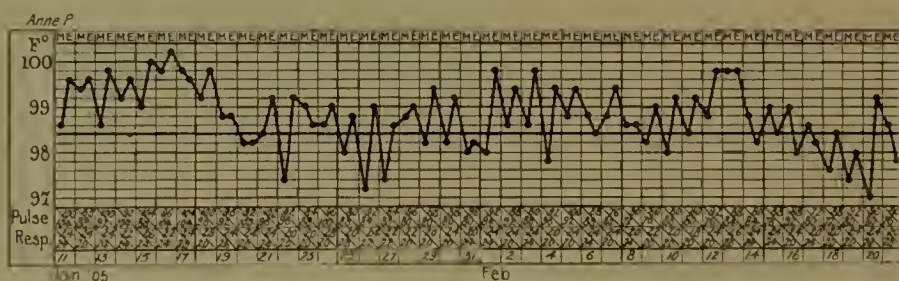
CASE 46.—Ref. No., Vol. 195, No. 59.—Annie P., æt. 50, a stewardess on a boat, was admitted on January 11th, 1905, and was discharged very slightly relieved on 20th February, 1905. She died soon after (see below). She gave a history of gradually increasing debility, with vomiting, diarrhœa, and indigestion extending over four years, and dating from an attack of "enteric fever" contracted at Naples. During the four years there had been many rallies, alternating with exacerbations in the symptoms that kept the patient in bed for weeks at a time. There was considerable pyorrhœa alveolaris, also slight œdema of the ankles, and a purpuric eruption. The heart was dilated, so that the impulse was in fifth left intercostal space one inch outside the nipple. There were hæmic bruits in all areas. The spleen was felt coming an inch below the ribs. The liver could not be palpated. Vomiting and diarrhœa were troublesome symptoms, but it was hardly possible to exclude arsenic as their cause, unless the original "typhoid fever" was in reality diarrhœa at the beginning of pernicious anæmia. On inquiry it turned out that she was only in bed four days for it, so that the enterica seemed unlikely. The pulse rate averaged 80 to 104, the respiration rate 20 to 28, and the temperature was up to 99° F. or 100° F. each night. Though a married woman, she had had neither child nor miscarriage, and menstruation had ceased three years before she came into hospital. She was a well-nourished woman of the lemon-yellow tint. She stated that at one time she had had so much pigmentation of the skin that her own doctor had diagnosed Addison's disease, but there was no such extensive pigmentation to be noted now. The nervous reflexes were natural, but subjective sensations of great numbness in her fingers and toes were complained of, especially in cold weather, and the patient was also troubled by the fact that she could not put her hands into cold water without the fingers going dead. The pyorrhœa alveolaris was treated by Mr. Maggs, and arsenic was given. Notwithstanding the use of this drug, the diarrhœa and vomiting both lessened, and the patient herself felt much better, though her blood counts did not improve much. The cardiac impulse came into the

nipple line. The husband gave the following history on 29th August, 1907:—
 “After leaving Guy’s, my wife went to a convalescent home, which she left very weak and ill. She rallied slightly when at home, being some days comparatively well, others ill and depressed. She had a very bad colour, coppery shade. She suddenly lost consciousness, and finally died on the 1st April, 1905.” The blood counts were as follows:—

| Date. | Red corpuscles, per cub. mm. | Red corpuscles, per cent. of normal. | Hæmoglobin, per cent. of normal. | Colour index. | Leucocytes per cub. mm. |
|---------------|------------------------------|--------------------------------------|----------------------------------|---------------|-------------------------|
| | Thoma Leitz. | | Haldane. | | Thoma Leitz. |
| 11 Jan., 1905 | 1,856,000 | 37 | 55 | 1.487 | 4,200 |
| 7 Feb., “ | 2,040,000 | 41 | 50 | 1.220 | — |
| 22 “ “ | 2,020,000 | 40 | 55 | 1.375 | 4,000 |

Note.—January 11th: S. 40, L. 6.4, P. 53, E. 0.6. February 22nd: S. 35, L. 4.4, P. 60, E. 0.6.

The temperature chart was as follows:—



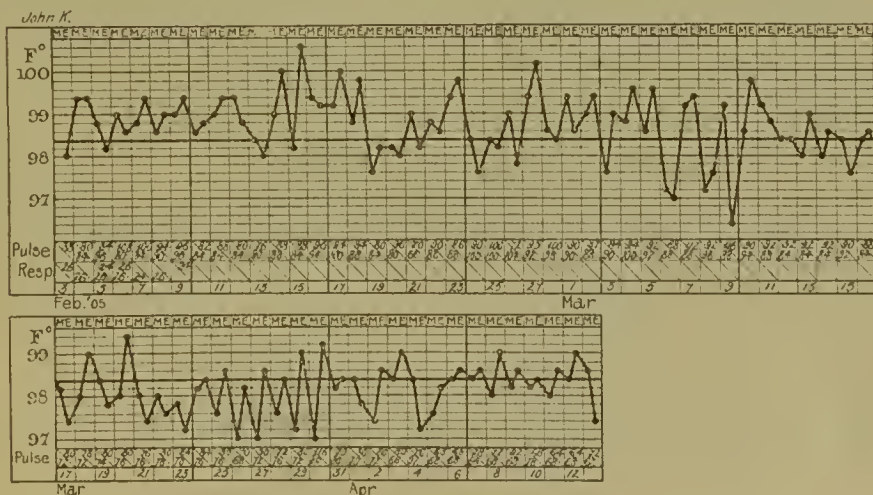
CASE 47.—Ref. No., Vol. 192, No. 82.—John K., æt. 55, a groom and gardener, was under the care of Dr. Taylor from February 3rd, 1905, to April 14th, 1905. He came in for giddiness and weakness, and marked numbness in hands and feet. He had always led a healthy outdoor life, and drank two pints of beer a day regularly. He gave only a history of three weeks' illness, beginning with an attack of severe vomiting; and he had been in bed for two weeks previous to his admission to hospital. His weight was 11st. 11lbs., and he did not look wasted. There was slight œdema of the ankles, a bruit de diable in the neck, and a hæmic bruit at the cardiac impulse, the heart sounds being barely audible elsewhere. Although his severe illness was only of three weeks' duration, he stated that for over twelve months past he had had a feeling of numbness and tingling in his hands and feet, which had been getting worse, especially in cool weather. Latterly he had been subject to attacks of sweating, giddiness, and blurred vision when at work, so that he has several times had to clutch hold of something to prevent himself from falling. He had had no actual “fits.” Three weeks ago, when feeding the calves before breakfast, he was suddenly seized with vomiting, and once since then he has had a sudden attack of nausea during which he tried to vomit, but could not. He was a strongly-built man, but very pale and yellow, and too weak to walk up the ward. When questioned, he stated that he had himself noticed the yellow pallor coming and going for

more than six months past. The exertion of getting to the ward was followed by six separate attacks of vomiting in rapid succession. The knee-jerks were increased in his knees, but there was no ankle clonus and the plantar reflexes were flexor. The teeth were few, but those that were left were clean and healthy. The urine was very dark brandy colour, acid, and of specific gravity 1026. No blood nor albumin present, nor bile pigment. The temperature was frequently 100° till the last two weeks of his stay in hospital when it was nearly normal. Neither liver nor spleen was palpable. C. A. K., of the same address, writes on August 20th, 1907: "In answer to your letter, my husband remained much the same until the cold weather came. From September last until April, 1907, he was very ill indeed; no one ever thought he could possibly recover. We consulted another doctor who recommended him extract of malt and cod liver oil; since then he is much better, able to get about and do light work." A further report from Dr. Sydney Moberly, of Winslow, Bucks, records the fact that John Kimble survived in a wonderful way, but died on April 21st, 1908. The blood counts were as follows:—

| Date. | Red corpuscles, per cub. mm. | Red corpus- cles, per cent. of normal. | Hæmoglobin, per cent. of normal. | Colour index | Leucocytes per cub. mm. |
|--------------|---------------------------------|--|--|--------------|-------------------------------|
| | Thoma Leitz. | | Haldane. | | Thoma Leitz. |
| 7 Feb., 1905 | 1,550,000 | 31 | 35 | 1.129 | — |
| 23 " " | 1,025,000 | 20 | 38 | 1.900 | — |
| 2 Mar., " | 1,370,000 | 27 | — | — | — |
| 13 " " | 1,900,000 | 38 | 33 | 0.869 | 7,500 |
| 20 " " | 1,550,000 | 31 | 43 | 1.387 | — |
| 31 " " | 1,950,000 | 39 | 44 | 1.128 | — |
| 10 April, " | 2,062,500 | 41 | 40 | 0.976 | — |
| 14 " " | 2,750,000 | 55 | 45 | 0.818 | — |

Note.—7th February, 1905: S. 20, L. 9, P. 66, E. 5, B. 0; many poikilocytes, megalocytes and nucleated red cells. 2nd March 1905: S. 23, L. 6, P. 67, E. 4, B. 0.

The temperature chart was as follows:—

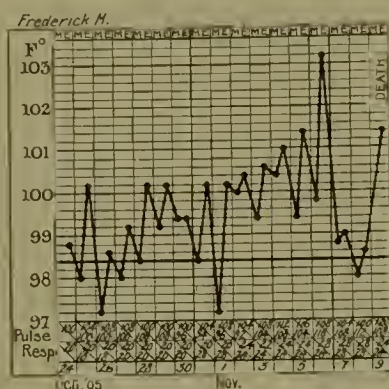


CASE 48.—Ref. No., Vol. 195, No. 662; Post-mortem No. 539, 1905.—Frederick M., æt. 45, a bootmaker, was admitted for extreme weakness, under the care of Sir Cooper Perry, on October 24th, 1905, and he died on November 29th, 1905. In August, 1904, he noticed that he gradually began to get very yellow, without anything very definite being the matter. He had no pain, and he continued to work, though he got progressively weaker and weaker. He and his friends thought his yellowness was “jaundice.” Latterly he had become extremely nervous and irritable, and for a year past he had had diarrhœa on and off. By the time of his admission he became light-headed and suffered from delusions; for example, he insisted that there was a bowl of flowers on the table when there was none. His temperature chart was typical, seldom coming below 98·4° F., and usually reaching to 100° F. or 101° F. each evening. The highest temperature was 103·2° F. The pulse rate varied from 92 to 120, the respirations from 18 to 24. The man was well nourished, but extremely pale and weak. The skin generally was of the lemon-yellow tint, whilst the sclerotics were pearly white. There was a tendency to pigmentation in the form of scattered pale brown spots on the trunk. By this time, however, he had been having arsenic for a long while, both at St. Bartholomew’s Hospital and in the Guy’s Hospital Out-patient Department, pernicious anæmia having been diagnosed in August, 1904. On his admission the heart was of natural size; there were hæmic bruits in all areas. The urine had a specific gravity of 1015; it was clear, pale yellow, and no indican nor any urobilin could be detected in it in the ordinary way. The knee-jerks and plantar reflexes were natural, nothing in the nervous system appearing to be abnormal except for the delusions mentioned. The latter may have been due to the many retinal hæmorrhages that, together with the definite exudation around the optic discs, were confirmed by Dr. Eason. The mouth was in a dirty state and the teeth bad. Neither liver nor spleen was felt. The patient sank gradually, and during the last twenty-four hours the breathing became very shallow, without being very fast. The lungs became “full of loud moist sounds,” and death ensued. All the viscera were noticeably pale. The lungs were œdematous. The heart weighed 487 grams, and exhibited well-marked tabby-cat striation in both ventricles. The liver gave a marked Prussian blue reaction. The spleen weighed 306 grams. The kidneys gave as marked a Prussian blue reaction as the liver, and they weighed 481 grams. The blood counts were as follows:—

| Date. | Red corpuscles, per cub. mm. | Red corpus- cles, per cent. of normal. | Hæmoglobin, per cent. of normal. | Colour index. | Leucocytes per cub. mm. |
|-------------------|---------------------------------|--|--|---------------|-------------------------------|
| | Thoma Leitz. | | Haldane. | | |
| 24 October, 1905 | 905,000 | 18 | 20 | 1·111 | — |
| 1 Nov., “ | 1,105,000 | 22 | 30 | 1·364 | — |
| 5 “ “ | 910,000 | 18 | 25 | 1·388 | leucopenia |

Note.—Poikilocytosis marked; several nucleated cells seen, some with karyokinetic figures; many megalocytes.

The temperature chart was as follows :—



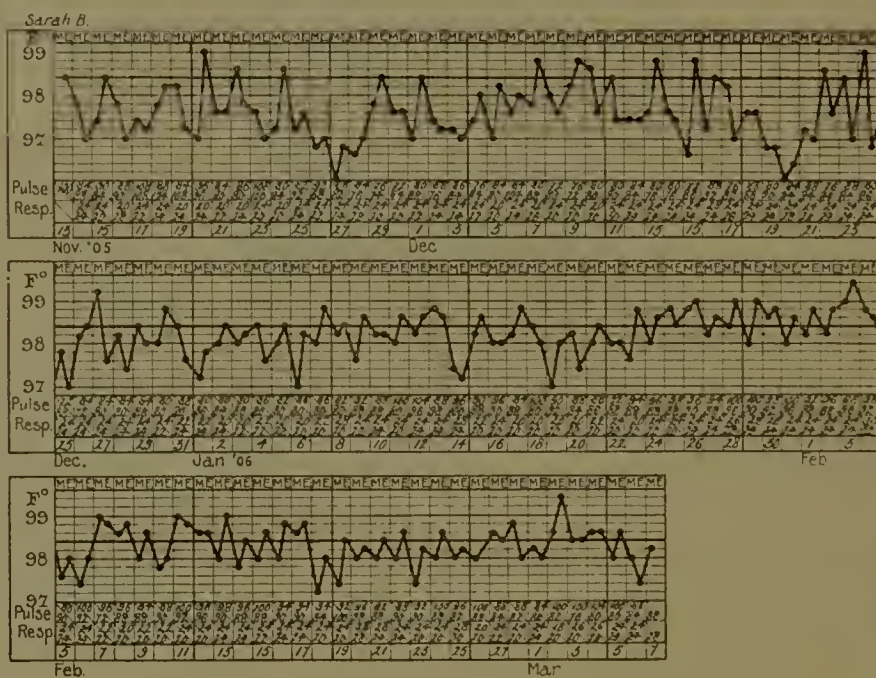
CASE 49.—Ref. No., Vol. 198, No. 79.—Sarah B., æt. 41, was in the hospital, under the care of Dr. Taylor, from November 15th, 1905, to March 7th, 1906. She was a schoolmistress by occupation, and had lived in Norfolk all her life. She was married, and had had no children, although there had been two miscarriages. Her present trouble dated to four years before her admission, when she developed continuous diarrhœa together with breathlessness. Then her fingers began to tingle, and this tingling soon spread to the whole of her body and legs. In April, 1905, her left leg became very weak and shaky, and some little time later her right leg followed suit. In July, 1905, the patient was so weak that she took to her bed, and had been there ever since. She had noises in her head, which were very troublesome. She was of a typical lemon-yellow tint with many brown spots upon her body and limbs. She had no teeth of her own, but a good set of false ones. The urine had a specific gravity of 1015; it was acid, and contained no obvious abnormality, excepting that upon careful search a small quantity of urobilin was detected. Her lungs were natural. There is no mention of liver, spleen or optic discs. As regards the nervous system, the wrist-jerks, elbow-jerks, and knee-jerks were all greatly exaggerated. There was an extensor plantar reflex on both sides with ankle clonus and some spasticity of the legs. The only hæmorrhage from which she had suffered was a sudden profuse hæmatemesis when she was out walking nine years before her admission. There had been no recurrence of this. The temperature was slightly but typically raised in the evening. Her apparent anæmia was greater than that usually measured by the blood examination. After her relief and discharge from Guy's Hospital she remained well at home for a short time, and then relapsed in November, 1906, becoming bedridden with much the same symptoms and physical signs as before, with the general appearance of one who was *in extremis* from hæmorrhage. The blood counts were as follows :—

| Date. | Red corpuscles, per cub. mm. | Red corpus- cles, per cent. of normal. | Hæmoglobin, per cent. of normal. | Colour index. | Leucocytes per cub. mm. |
|------------------|---------------------------------|--|--|---------------|-------------------------------|
| | Thoma Leitz. | | Haldane. | | Thoma Leitz |
| 15 Nov., 1905 | 3,100,000 | 62 | 75 | 1.209 | — |
| 10 Dec., " | 4,500,000 | 90 | 80 | 0.888 | — |
| 12 January, 1906 | 5,600,000 | 112 | 100 | 0.892 | — |

Note.—November 15th, 1905: Blood films showed marked poikilocytosis, but no nucleated red cells. The differential leucocyte count was as

follows: S. 20, L. 9, P. 67, E. 4. January 12th, 1906: The differential leucocyte count was as follows: S. 34, L. 1.5, P. 62, E. 1, B. 1.5.

The temperature chart was as follows:—



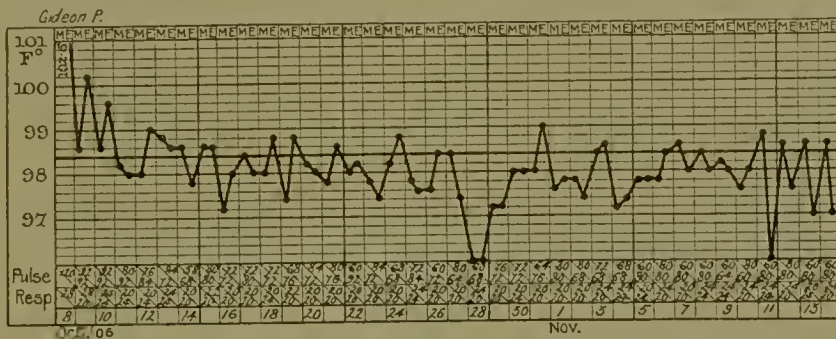
CASE 50.—Ref. No., Vol. 199, No. 412.—Gideon P., æt. 31. a bricklayer, was admitted under Dr. Hale White on October 8th, 1906. It is just possible, perhaps, that this was not a case of pernicious anæmia, for though the anæmia was severe and the colour index high for a severe anæmia, other than pernicious anæmia, it was not proved to have actually exceeded 1. Clinically, on the other hand, the diagnosis was pernicious anæmia. He was a married man with two children. He had been through the South African war, during which he suffered from enteric fever; and he had been home from South Africa for three and a half years, during all which time he had been out of work. He gave a history of having had rheumatic fever at 18 and pneumonia at 24, but of otherwise being sound and well—except for the enterica—until he felt himself to be getting physically weak a fortnight previous to his admission. He had “never been like this before.” Ten days before his admission he had a shivering fit and took to bed; and he also suffered from headache, absent-mindedness and constipation. He was a dark-complexioned man, but showed the pale yellow tinge of pernicious anæmia cases—this colour had been spoken of by his friends as “jaundice.” The urine was dark but clear, and no abnormal constituents were mentioned in it. The teeth were mostly carious, but the mouth was clean, for the patient had been in the habit of using potassium permanganate solution as a mouthwash. The spleen was readily felt coming down to the level of the umbilicus. The liver was not felt. The lungs and nervous system seemed natural. The heart was of natural size, but indeterminate systolic bruits—probably hæmic because they disappeared as the blood condition improved—were heard in all areas. The retinæ exhibited multiple

small hæmorrhages (Dr. Eason). Treatment was by arsenic, and improvement was considerable and rapid. The patient's wife writes on August 29th, 1907: "I write on behalf of my husband . . . who is at present time in Ontario. He writes saying he feels better since he been out there than he was at home. He been out there just over three months. He only done one week's work since he came out of Guy's till he started for Canada." The temperature chart showed practically no evening rises. The blood counts were as follows:—

| Date. | Red corpuscles, per cub. mm. | Red corpus- cles, per cent. of normal. | Hæmoglobin, per cent. of normal. | Colour index. | Leucocytes per cub. mm. |
|-----------------|---------------------------------|--|--|---------------|-------------------------------|
| | Thoma Leitz. | | Haldane. | | Thoma Leitz. |
| 8 October, 1906 | 1,525,000 | 30 | 30 | 1·000 | 3,200 |
| 5 Nov. | 4,200,000 | 84 | 75 | 0·893 | 4,000 |

Note.—Many poikilocytes and many nucleated red corpuscles. S. 23, L. 6, P. 69, E. 2.

The temperature chart was as follows:—



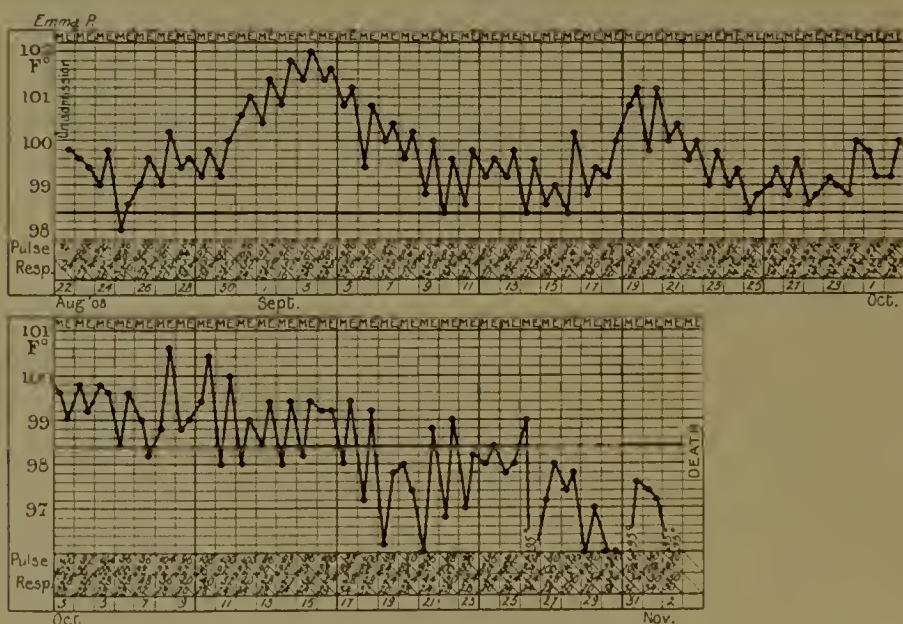
CASE 51.—Ref. No., Vol. 198, No. 304; Post-mortem No. 529, 1906.—Emma P., æt. 56, a housewife, was admitted under Dr. Taylor on August 22nd, 1906, and died on November 3rd, 1906. She was a married woman with one son. She had had a life of hard work, but had been perfectly well until two months previous to her admission, when she noticed that "her legs were swollen, and that she could not get her breath." Two weeks later she was obliged to take to her bed. When admitted she was orthopnœic, and very pale and ill. Her teeth had been very carious, and she now had a denture. Neither liver nor spleen was palpable. The nerves seemed natural. The heart was not increased in size, but there were hæmic bruits both at the impulse and in the pulmonary area. The urine was of specific gravity 1016, and it exhibited no obvious abnormality. The gastric juice contained abundance of free hydrochloric acid. On October 31st there were signs suggestive of fluid at the base of each lung; on November 1st the patient became very drowsy; on November 2nd she became comatose, and on November 3rd she died. At the autopsy the liver, kidneys and spleen all gave a well-marked Prussian blue reaction. There was œdema of the legs and thighs; the body generally, and particularly the subcutaneous fat, was of a primrose yellow colour, and not at all emaciated. Each pleura contained nearly half a pint of serous fluid, and so did the pericardium.

There was no pericarditis. The heart weighed 391 grams. There was bright lemon-yellow fat in excess upon the surface, and thence infiltrating the muscle. The interior of the left ventricle exhibited well-marked tabby-eat striation. The liver weighed 1848 grams, exhibited the typical café-au-lait colour, and microscopically exhibited much fatty change in its cells. The spleen weighed 248 grams, but except for its size and its iron reaction looked natural, both macroscopically and microscopically. The kidneys were pallid, but otherwise, except for the iron reaction, did not look abnormal to the naked eye or microscopically. During life the pulse rate averaged 92, the respiration rate 24, and the temperature was raised each evening, except for a few days before death. The blood counts were as follows:—

| Date. | Red corpuscles, per cub. mm. | Red corpus- cles, per cent. of normal. | Hæmoglobin, per cent. of normal. | Colour index. | Leucocytes per cub. mm. |
|-----------------|---------------------------------|--|--|---------------|-------------------------------|
| | Thoma Leitz. | | Haldane. | | |
| 22 August, 1906 | 2,100,000 | 42 | 40 | 0.952 | 4,213 |
| 31 " " | 1,300,000 | 26 | 32 | 1.231 | 3,125 |
| 7 Sept. " | 1,000,000 | 20 | 31 | 1.550 | — |
| 9 Oct. " | 600,000 | 12 | 17 | 1.417 | 2,500 |

Note.—S. 34, L. 8, P. 52, E. 5, B. 1. There was one nucleated red cell for each 100 leucocytes.

The temperature chart was as follows:—



CASE 52.—Ref. No., Vol. 199, No. 77.—Martha G., æt. 39, a cook, was under the care of Dr. Hale White from January 23rd, 1906, to April 25th, 1906. The main points of the case may be summarised as pernicious anæmia, vomiting, hæmoptysis, hæmatemesis, tyrosin found in the urine. She was an unmarried woman, but she had had one child. She looked well nourished, but she was extremely anæmic. She stated that she was well until the beginning of 1905, when she began to suffer from lack of strength,

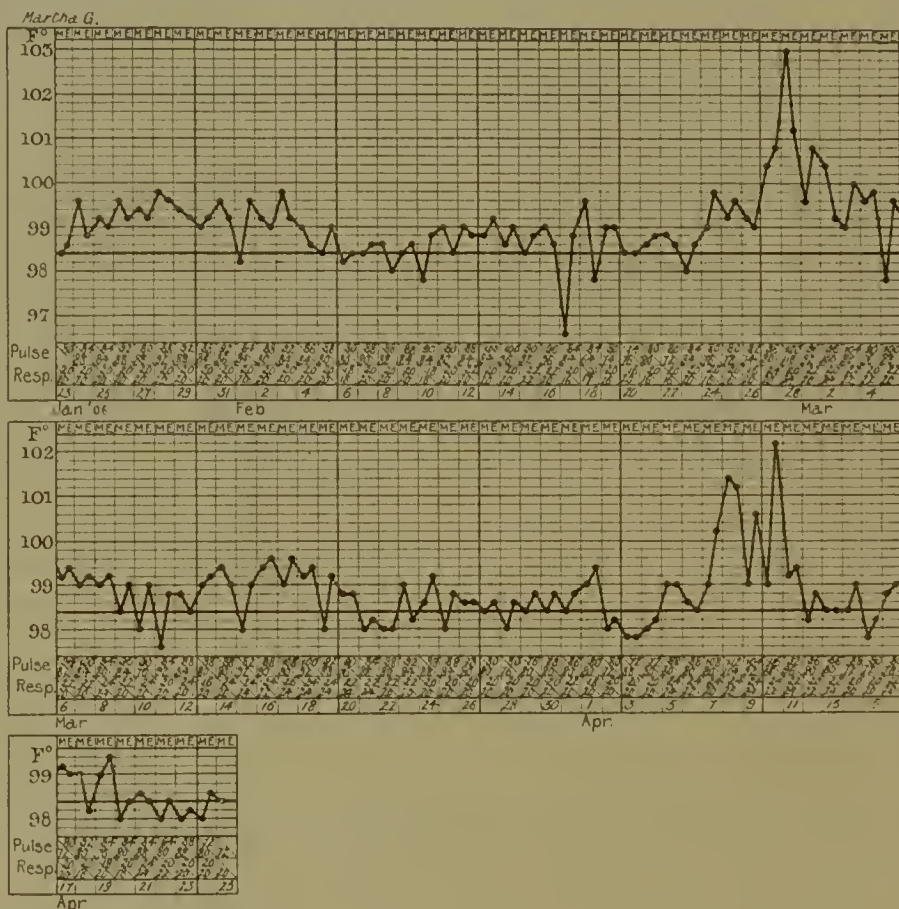
vomiting, pallor, and severe diarrhœa. The vomiting became very severe unless she stayed in bed. She was sick four times a day if she tried to keep about, but when she went to bed the vomiting ceased. She was an in-patient in Guy's Hospital during 1905 for her abdominal symptoms, but the diagnosis of pernicious anæmia was not made at that time. She improved in health for a while, but soon after Christmas, 1905, she began to get rapidly worse again, so that she was quite unable to continue at work. On admission in 1906 she was a typical case of pernicious anæmia. The pulse rate, in bed, was about 80, her respiration rate about 20, and her temperature chart exhibited the very typical variations from normal or subnormal in the morning to 99° F., 100° F., or even 102° F. or 103° F. at night. There were hæmic bruits in all areas; the cardiac impulse was in its normal place. The urine contained urobilin, and yielded tyrosine crystals spontaneously in the centrifugalized deposit. Neither albumen nor blood were detected. The lung signs were normal; the optic discs and retinæ were natural; both liver and spleen were palpable. The right plantar reflex was persistently extensor, though the left was flexor, and there was no ankle clonus. The patient was greatly relieved when she was discharged in April, 1906, but by August, 1906, she had completely relapsed, and was at that time admitted to St. George's Hospital. The two new points noted at that time were, first, that she was very tender as to her bones at first, this tenderness becoming much less obvious after she had been in bed three weeks; and, secondly, that her spleen was very much larger than it had been in April, extending now across to the middle line and down to two and a half inches below the umbilicus. She slowly rallied again, and was discharged relieved at the beginning of October, 1906. The last news of her was that, "... She came home and lingered about until December, 1906, when she took to her bed and my doctor attended her, but she died in February, 1907, in the greatest agony with her heart, and pain in the nose and forehead, with bleeding of the nose and spitting of blood with thick phlegm. I have every reason to believe that my sister's illness was brought on by fright three years ago." The blood counts were as follows:—

| Date. | Red corpuscles, per cub. mm. | Red corpus- cles, per cent. of normal. | Hæmoglobin, per cent. of normal. | Colour index. | Leucocytes per cub. mm. |
|---------------|---------------------------------|--|--|---------------|-------------------------------|
| | Thoma Zeiss. | | Haldane. | | Thoma Zeiss. |
| 25 Jan., 1906 | 1,500,000 | 30 | 35 | 1.166 | 2,200 |
| 31 " " | 1,060,000 | 21 | 40 | 1.905 | 6,200 |
| 8 Feb, " | 1,560,000 | 31 | 42 | 1.355 | 10,000 |
| 16 " " | 1,280,000 | 26 | 40 | 1.539 | 8,000 |
| 22 " " | 2,120,000 | 44 | 42 | 0.954 | 7,700 |
| 1 March " | 1,250,000 | 25 | 38 | 1.520 | — |
| 8 " " | 1,680,000 | 34 | 38 | 1.117 | 7,200 |
| 15 " " | 1,700,000 | 34 | 45 | 1.326 | 7,000 |
| 22 " " | 1,880,000 | 38 | 40 | 1.050 | — |
| 30 " " | 2,425,000 | 48 | 60 | 1.250 | — |
| 15 Aug. " | 880,000 | 18 | 26 | 1.444 | 3,000 |
| 5 Sept. " | 1,820,000 | 36 | 40 | 1.111 | 6,100 |
| 19 " " | 1,560,000 | 31 | 46 | 1.484 | 5,700 |
| 8 " " | 1,601,000 | 32 | 49 | 1.531 | 7,900 |

Note.—January 25th, 1906: S. 40, L. 4, P. 49, E. 7. January 31st: Many poikilocytes and megalocytes, but no nucleated red cells seen. February 16th:

S. 35, L. 4, P. 57, E. 4. March 15th: S. 38, L. 2, P. 58, E. 2; five nucleated red cells for each 100 leucocytes. August 15th: S. 35, L. 3, P. 58, E. 3, M. 1.

The temperature chart was as follows:—



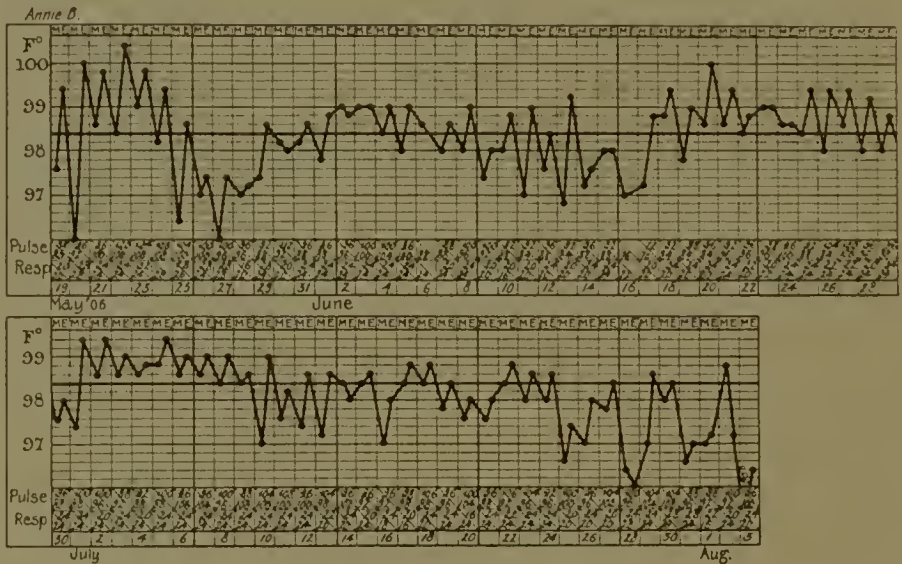
CASE 53.—Ref. No., Vol. 196, No. 188.—Annie B., æt. 33, a housewife, was admitted under Dr. Taylor on May 19th, 1906, and was discharged on August 3rd, 1906, relieved. She had previously been in St. Thomas' Hospital from November, 1905, to January, 1906; and was re-admitted there from September, 1906, to November, 1906, when she died. She was a married woman who had had one child and no miscarriage. Her illness started eight months before her first admission to St. Thomas' Hospital, with an increasing general weakness. She had also noticed puffiness of her ankles and feet, especially on walking, loss of appetite, dyspepsia, and a ringing in her ears. On admission she was a typical case of pernicious anæmia. The heart was a little dilated, and there were generalised hæmic bruits and a bruit de diable in the neck. The liver came one and a half inches below the ribs in the right nipple line. The spleen was not felt. There were no retinal hæmorrhages. There was widespread pigmentation of the skin in patches and in specks, and there was also pigmentation of the buccal mucosa on the inside of the cheeks; this was confirmed at autopsy. The pigmentation was not known to have antedated arsenical treatment, however. The urine was high coloured, of specific gravity 1012; it contained neither albumin nor blood, but gave a well-marked urobilin band spectroscopically. The temperature was ofte

99° F. to 100° F., the pulse rate 88 to 100, and the respiration rate 20 to 24. There were curious subjective sensations of paræsthesia, in particular in her thighs, which seemed to her at all times to "feel too hot inside and cold out" in a way which struck her as both abnormal, inconvenient and different to her sensations in other parts of her body. The behaviour of her knec-jerks is noteworthy. They were present on admission to St. Thomas' Hospital, but they had disappeared on December 21st, 1905, when liquor arsenicalis was being given in doses of mij . The medicine was stopped, and the knec-jerks had returned on December 27th, 1905. Liquor arsenicalis in doses of miii . was again given, and the knec-jerks were again absent on January 3rd, 1906. They had returned by the time of her re-admission in May. They were again absent in September, 1906. From Guy's Hospital the patient went to a convalescent home; then relapsed and went to St. Thomas' Hospital. Pigmentation of the skin and buccal mucosa was very well marked. Pleurisy set in on the right side, and on November 11th, 1906, three pints of pleuritic fluid were withdrawn, followed on November 25th by another four pints. The patient collapsed and died on the night after the second aspiration. Post-mortem, purulent inflammation of the alveolar sockets with looseness of all the teeth were noted; also pigmentation of the interior of the cheeks. There were shallow circular ulcers of the skin around the left patella. Acute pleurisy had occurred on both sides. The heart was not dilated, it was encased in the usual bright yellow fat, its valves were healthy, its muscle pale and soft. The liver was large, paler than normal, and gave a good Prussian blue reaction. The kidneys were markedly anæmic, and gave a slight Prussian blue reaction. The spleen was large, pale red, and gave some Prussian blue reaction. The marrow of the long bones was red. Microscopically, the marrow showed well-marked megaloblastic change. The heart exhibited pigmentary degeneration, fatty change, and slight mononuclear infiltration. The iron granules in the liver cells were chiefly at the periphery of the lobules. The spleen showed no fibrosis. The kidney exhibited catarrhal changes in the tubules and also iron granules in the epithelial cells. For notes of this case when in St. Thomas' Hospital I am indebted Dr. H. C. Squires. The blood counts were as follows:—

| Date. | Red corpuscles, per cub. mm. | Red corpus- cles, per cent. of normal. | Hæmoglobin, per cent. of normal. | Colour index | Leucocytes, per cub. mm. |
|---------------|---------------------------------|--|--|--------------|--------------------------------|
| 18 Nov., 1905 | 981,280 | 19 | 25 | 1.316 | — |
| 30 " " | 843,750 | 19 | 20 | 1.052 | — |
| 12 Dec., " | 1,100,000 | 22 | 25 | 1.136 | — |
| 30 " " | 2,231,250 | 45 | 40 | 0.888 | — |
| 4 Jan., 1906 | 3,325,000 | 66 | 50 | 0.757 | — |
| 20 May, " | 1,800,000 | 36 | 40 | 1.111 | — |
| 8 June, " | 2,000,000 | 40 | 25 | 0.625 | — |
| 19 " " | 2,040,000 | 41 | 35 | 0.854 | — |
| 29 " " | 2,640,000 | 53 | 40 | 0.755 | — |
| 20 July, " | 3,800,000 | 76 | — | — | — |
| 5 October " | 679,687 | 13 | 20 | 1.539 | — |
| 18 " " | 1,178,125 | 23 | 25 | 1.087 | — |
| 11 Nov., " | 1,259,400 | 25 | 25 | 1.000 | — |

Note.—18th November, 1905, to 4th January, 1906: Normoblasts and at least one megaloblast seen at each count except the last. 20th May, 1906: Poikilocytosis very marked, and many nucleated red cells seen.

The temperature chart was as follows:—

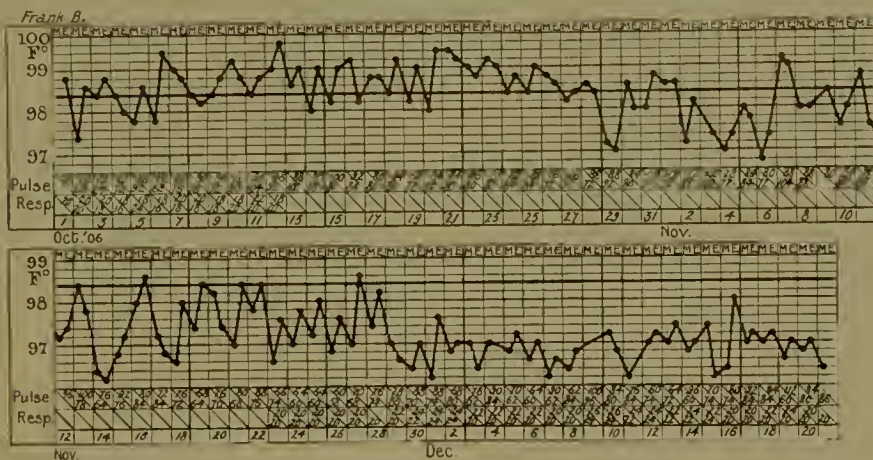


CASE 54.—Ref. No., Vol. 196, No. 366.—Frank B., æt. 48, a commissionaire, was admitted under Dr. Taylor on October 1st, 1906, for œdema and pains in his legs, and was sent to an Asylum for the Insane on December 21st, 1906. He was a married man with seven children. He was in the Army in India for six years, and suffered from dysentery. About four months before his admission he had much bleeding from what were regarded as piles. It was nine months before admission, however, that he first began to ail from swelling and pain in the right leg from knee to ankle; two months after which he began to get short of breath, and he rapidly became so weak that he was soon unable to remove his own boots. He was still well covered with fat, but he stated that he had been getting thinner. His teeth were carious; his general appearance was that of a case of pernicious anæmia, and this was confirmed by the blood counts. He developed delusions, however, and became very impulsive and dangerous, so that he had to be removed to an asylum as a case of mania in addition to pernicious anæmia. Neither liver nor spleen could be felt. The lungs were natural. There were neither retinal nor other hæmorrhages. The peripheral nervous system seemed natural. The urine was amber yellow, of specific gravity 1020, acid, and free from albumin and blood. The report from Cane Hill Asylum on August 15th, 1907, was as follows:—"Frank B. Mental condition.—Dull confused appearance. Talks to himself. Is actively hallucinated, both auditory and probably visual. Talks incoherently about 'pice,' 'mines just over the hill.' Uses a number of native Urdu words. Mixes identities. Fails even to recognise his wife who visits him. Orientation very bad; no idea of time or place. Has neglected calls of nature, and requires much care and attention. Urine pale lemon colour, specific gravity

1009, acid. No bile pigment, albumin or sugar." The blood counts were as follows:—

| Date. | Red corpuscles, per cub. mm. | Red corpus- cles, per cent. of normal. | Hæmoglobin, per cent. of normal. | Colour index. | Leucocytes per cub. mm. |
|------------------|---------------------------------|--|--|---------------|-------------------------------|
| | Thoma Leitz | | Haldane | | Thoma Leitz |
| 4 Oct., 1906 ... | 1,225,000 | 24 | 38 | 1.583 | 8,000 |
| 19 " " ... | 2,500,000 | 50 | — | — | 8,000 |
| 21 Nov., " ... | 3,573,800 | 71 | 78 | 1.099 | — |
| 12 Dec., " ... | 3,200,000 | 64 | 74 | 1.157 | — |

The temperature chart was as follows:



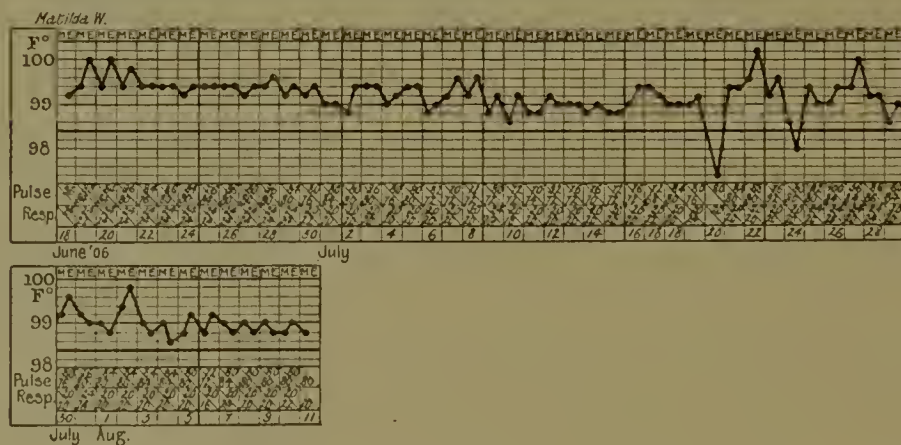
CASE 55.—Ref. No., Vol. 197, No. 270.—Matilda W., æt. 51, a domestic nurse, was under Dr. Hale White from June 18th, 1906, to August 11th, 1906. She was admitted for anæmia, weakness, and palpitations of the heart. An unmarried woman, she had always enjoyed good health and comfortable surroundings in the service of a wealthy family. A year and a half previous to her admission she caught whooping-cough from the children she was in charge of, and this caused the appearance of a large femoral hernia, which was operated upon successfully in Sweden at Christmas, 1905. She said she had never been well since the operation, but had gradually become physically weaker and more anæmic, with loss of appetite and liability to palpitations of the heart. She also began to suffer from attacks of what she called "bilious vomiting," without diarrhœa, and before she took to her bed there had been some œdema of the ankles after walking or standing long. She also had curious pains in the legs from the knees downwards, which she compared to "those caused by walking in deep snow." She was quite a cheerful person, typically lemon-yellow in colour, and fairly well covered. The urine was pale in colour, of specific gravity 1009, and it contained neither albumin nor blood; urobilin is not mentioned. The lungs were natural. The heart was of natural size, but

exhibited hæmic bruits in all areas. The spleen and the liver were not palpable. The reflexes were natural. The teeth were "bad," and the tongue white and coated. The respiration rate usually lay between 20 and 24, the pulse rate, when in bed, between 70 and 90, and the slight daily pyrexia, up to 99° F. or 100° F., was well marked. Treatment was by liquor arsenicalis, which was increased up to a dose of mix. The patient returned home greatly improved in health, but she relapsed next year. The following was the reply to inquiry in August, 1907:—"Miss W. has been ill off and on since her discharge in August, 1906. Since November, 1906, she has been treated by several doctors, one specialist saying she might live until June, 1908, if she kept quiet and calm. At present she is very ill, and unable to write herself." This is the last that was known of her. The blood counts were as follows:—

| Date. | Red corpuscles, per cub. mm. | Red corpus- cles, per cent. of normal. | Hæmoglobin, per cent. of normal. | Colour index. | White cor- puscles, per cub. mm. |
|---------------|---------------------------------|--|--|---------------|--|
| 21 June, 1906 | 1,237,500 | 25 | 33 | 1.320 | 6,146 |
| 23 " " | 1,250,000 | 25 | 35 | 1.400 | 6,770 |
| 16 July, " | 1,950,000 | 39 | 36 | 0.923 | — |
| 8 Aug., " | 3,340,000 | 67 | 67 | 1.000 | 7,500 |

Note.—June 23rd: S. 24, L. 5, P. 69, E. 2. July 16th: S. 24, L. 9, P. 67, E. 0.

The temperature chart was as follows:—



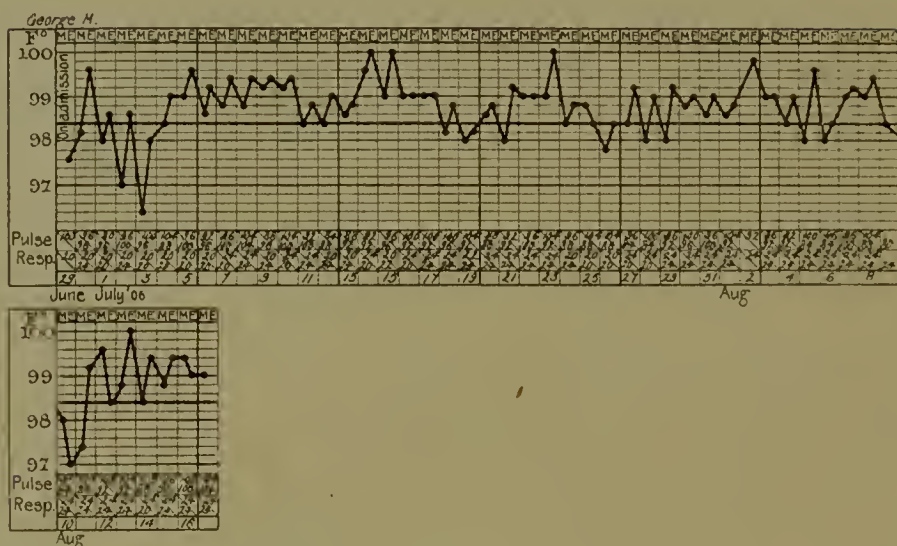
CASE 56.—Ref. No.. Vol. 201, No. 247.—George M., æt. 50, a lithographic draughtsman, was under Sir Cooper Perry from 29th June to 17th August, 1906. Agnes P., of the same address, writes that "Mr. M. died in November, 1906." He was a married man with two children. He had been born in Jamaica, but had lived in England since he was 10 years old; at first he had always been suffering from severe coughs and colds. Afterwards he had been well until shortly before his admission. Notwithstanding his occupation, he had

had nothing to do with lead, and was admitted for "general debility." He had been taken three years previously with pains in his back and chest, and these pains got worse and extended to the buttocks and legs. Lately there had been increasing anæmia with shortness of breath and some impairment of vision. There had been no particular gastro-intestinal symptoms until recently, when retching and flatulence without vomiting developed. The patient had done no work for two months previously, for he was unable to endure any fatigue. The death of his mother two weeks previous to his admission had made his general condition worse. When seen he was very anæmic indeed, but not very yellow. There was no general pigmentation of his body, but there were many brown spots on his left elbow and on both his big toes. There was no pigmentation in the mouth. The heart was of natural size, but there was a hæmic bruit at the impulse. The lungs were natural, the teeth were very septic and outstanding from the gums, and the tongue was furred and white. The lower edge of the liver could be just felt, and the spleen was just palpable. The knee-jerks and other reflexes were natural. The urine had a specific gravity of 1016. It contained no albumin. After arsenical treatment was adopted vomiting became very troublesome. The patient suffered from a good many symptoms which were regarded as neurotic. The pulse rate averaged 80 to 104, the respiration rate 20 to 24. The temperature chart was a typical one, with evening rises to 99° F. or 100° F. Towards the end of his stay in hospital the spleen was felt one inch below the ribs. The blood counts were as follows:—

| Date. | Red corpuscles, per cub. mm. | Red corpus- cles, per cent. of normal. | Hæmoglobin per cent. of normal. | Colour index. | Leucocytes per cub. mm. |
|--------------|---------------------------------|--|---------------------------------------|---------------|-------------------------------|
| | Thoma Leitz. | | Haldane. | | Thoma Leitz. |
| 3 July, 1906 | 1,790,000 | 38 | — | 0.948 | 6,980 |
| 10 " " | 2,215,000 | 44 | 36 | 9.750 | 4,320 |
| 16 " " | 1,160,000 | 23 | 33 | 1.739 | 5,000 |
| 24 " " | 1,550,000 | 31 | 40 | 1.107 | 3,600 |
| 31 " " | 1,200,000 | 24 | 34 | 1.333 | 6,250 |
| 7 Aug. " | 1,600,000 | 32 | 32 | 1.062 | — |
| 14 " " | 1,300,000 | 26 | 35 | 1.346 | 3,500 |

Note.—July 3rd: Blood films showed marked poikilocytosis and polychromasia, in addition to which there were nucleated red corpuscles and many megalocytes. The differential leucocyte count was as follows:—S. 34, L. 12, P. 52, E. 0, B. 2. July 10th: Films show many megalocytes, microcytes, and poikilocytes. The differential leucocyte count was as follows:—S. and L. 28, P. 69, E. 2, B. 1. July 24th: There were more normocytes than before, but there were still many poikilocytes and megalocytes; and four nucleated red corpuscles were counted to every 100 leucocytes. The differential leucocyte count was as follows:—S. 27, L. 13, P. 56, E. 3, B. 1. August 13th: Nucleated red cells were still present. The differential leucocyte count was as follows:—S. 32, L. 8, P. 57, E. 3.

The temperature chart was as follows :—



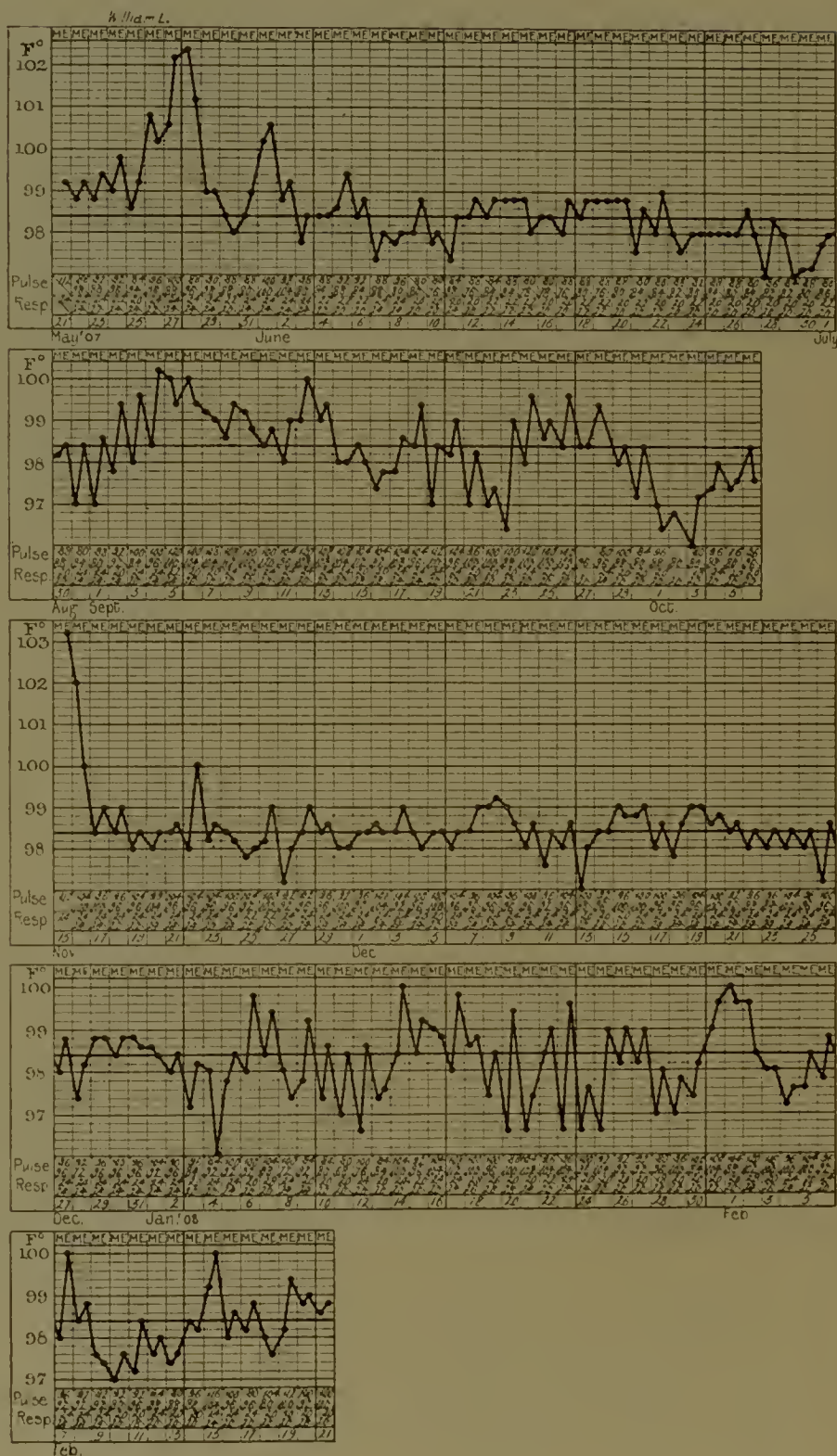
CASE 57.—Ref. Nos., Vol. 201, No. 52 ; Vol. 206, No. 337 ; Vol. 208, No. 373 ; Vol. 214, No. 3.—William L., æt. 44, a railway porter, was under Dr. Fawcett, from January 9th, 1906, to March 29th, 1906, when he was discharged, to be re-admitted on May 21st, 1907, and re-discharged on July 7th, 1907. He was under Dr. Beddard from August 29th, 1907, to October 6th, 1907 ; and under Dr. Hale White from November 16th, 1907, to February 21st, 1908. He had been born in Cheshire, and had lived in London for the last twenty years. Eight months previous to his admission in 1906 he complained of increasing weakness, and of progressive loss of weight, shortness of breath, and occasional attacks of abdominal pains. He also had epistaxis from time to time, and if he walked much he had some puffiness of his feet and ankles. His blood condition improved enormously, and the patient was discharged apparently well. The only points to note about him beyond the blood condition were that his urine contained urobilin to the spectroscopic test, and he bore arsenical treatment well, the dose being increased up to eight minims of the liquor thrice daily, and that the gastric juice was deficient in H.Cl. He went from Guy's Hospital to a convalescent home at Swanley, and on his return from there he continued his work for five months, feeling perfectly well all that time. He then relapsed, and attended the Out-patient Department, but managed to continue his work until Christmas, 1906. He then had to give up, as he felt too weak to continue. Moreover, if he tried to walk his legs became very painful and swollen. His colour had previously been very fair, but now it became a typical yellow. There had been epistaxis on several occasions again. There had been no vomiting ; there was a marked tendency to constipation. The teeth were not in a very bad condition, but several of them were decayed, and they were not absolutely clean. The retinae exhibited hæmorrhages, and urobilin was again found in the urine. The reflexes were natural. Neither liver nor spleen was felt. The temperature chart showed much the same sort of slight pyrexia, as most of these

cases do. He was discharged much relieved, and stayed with some friends in Yorkshire for three weeks; during the third week he began to feel weaker and lost his appetite. On his return to London he was one of Dr. Fawcett's out-patients, and was treated with arsenic, malt and iron. On re-admission he was of a typical lemon yellow colour; the spleen was palpable; the liver was not felt; the heart was of normal size, and no bruit was heard. The lungs were normal and the nervous reflexes were natural. He relapsed again, and was re-admitted upon November 16th, 1907, to be re-discharged upon February 21st, 1908. Treatment was again by means of arsenic. At first upon this occasion diarrhœa replaced the former constipation, but otherwise there was little fresh to note. He discharged himself against advice. The blood counts were as follows:—

| Date. | Red corpuscles, per cub. mm. | Red corpus- cles, percent. of normal. | Hæmoglobin, per cent. of normal. | Colour index. | Leucocytes, per cub. mm. |
|---------------|---------------------------------|---|--|---------------|--------------------------------|
| | Thoma Leitz. | | Haldane. | | Thoma Leitz. |
| 13 Jan., 1906 | 1,500,000 | 30 | — | — | 4,400 |
| 15 " " | 1,892,000 | 38 | 52 | 1.369 | 3,475 |
| 7 Feb., " | 2,600,000 | 52 | 62 | 1.192 | 6,250 |
| 5 March, " | 5,450,000 | 109 | 75 | 0.688 | 4,600 |
| 21 May, 1907 | 1,400,000 | 28 | 28 | 1.000 | 3,600 |
| 28 " " | 2,100,000 | 42 | 38 | 0.905 | — |
| 13 June, " | 2,100,000 | 42 | 48 | 1.143 | — |
| 19 " " | 3,200,000 | 64 | 55 | 0.860 | — |
| 26 " " | 3,500,000 | 70 | 60 | 0.857 | 3,600 |
| 29 August, " | 1,982,000 | 40 | 45 | 1.125 | 3,960 |
| 14 Sept., " | 1,500,000 | 30 | 40 | 1.333 | — |
| 6 Oct., " | 2,458,333 | 49 | 60 | 1.224 | — |
| 18 Nov., " | 1,500,000 | 30 | 40 | 1.333 | — |
| 16 Dec., " | 3,000,000 | 60 | 60 | 1.000 | — |
| 3 Jan., 1908 | 2,500,000 | 50 | 38 | 0.760 | — |
| 16 " " | 1,500,000 | 30 | 50 | 1.666 | — |
| 30 " " | 1,300,000 | 26 | 55 | 2.115 | — |
| 8 Feb., " | 800,000 | 16 | 40 | 2.500 | — |
| 9 " " | 900,000 | 18 | 40 | 2.222 | — |
| 12 " " | 1,500,000 | 30 | 40 | 1.333 | — |

Note.—January 15th, 1906: Films showed many poikilocytes. February 7th, 1906: Poikilocytes and megalocytes both numerous. May 21st, 1907: Poikilocytosis well marked. June 13th, 1907: Fair numbers of megaloblasts and normoblasts. June 19th, 1907: The differential leucocyte count was noted as being natural. January 9th: The differential count was as follows:—S. 30, L. 3, P. 63, E. 1, B. 3. February 3rd: S. 35.7, L. 3.6, P. 60.7, E. 0, B. 0. June 13th: S. 27, L. 2, P. 65, E. 3, B. 3. August 29th: S. 23, L. 4, P. 72, E. 1, B. 0, M. 0. Poikilocytes were marked in the films. Three nucleated red corpuscles to each film. November 18th, 1907: Poikilocytes very marked; no nucleated red corpuscles. November 30th, 1907: Poikilocytes very numerous; still no nucleated red corpuscles seen. February 6th, 1908: Patient very much weaker on account of diarrhœa. Cacodylate of soda in one grain doses given subcutaneously.

The temperature chart was as follows :—



CASE 58.—Ref. No., Vol. 204, No. 363; Post-mortem, No. 469, 1907. Robert M., æt. 49, a carman, was admitted under the care of Dr. Shaw on September 27th, and died September 29th, 1907. He came in for pains in the abdomen and for sickness. He had never been ill previous to his present illness. He began to feel unwell twelve months ago. During the last two months he had been definitely worse, being unable to retain any food. He had been accustomed to take beer, but this now so irritated his stomach that he was obliged to give it up. Formerly the food would remain in the stomach for half a day before being vomited, now it was often brought up within a few minutes of being swallowed. The only thing he could keep down was plain water. He had never seen blood in his vomit, nor passed any per rectum, but he had often suffered from epistaxis. His bowels had been moved regularly. He had suffered from a rather troublesome cough lately, whilst at the least exercise he became short of breath. He looked thin, weak, and anæmic, with the typical lemon-coloured skin. He was first admitted to the surgical side, into Naaman Ward, under the impression that he had some surgical gastric lesion, but was transferred to the medical side. The heart was decidedly hypertrophied, but there were no definite bruits. The lungs were normal. As regards the teeth, they were not good. The stomach was not dilated. The liver could be felt three and a half inches below the costal margin, and it was smooth. The spleen was palpable. The urine was straw-coloured, acid, and had a specific gravity of 1008; it contained a small quantity of albumin. The patient died of heart failure. At the post-mortem examination the lungs were pale and œdematous. There was recent pleurisy at the right apex, with recent pneumonia beneath it. There was early pericarditis. The heart was hypertrophied, weighing 652 grams. The mitral valve was stenosed, and the aortic valves were thick and bore recent vegetations. The spleen weighed 417 grams, and there was recent capulitis over it. The kidneys weighed 372 grams, and they were pallid. The liver gave a very well-marked blue ferrocyanide reaction. The bone marrow of femur was red. The blood counts were as follows:—

| Date. | Red corpuscles, per cub. mm. | Red corpus- cles, percent. of normal. | Hæmoglobin, per cent. of normal. | Colour index. | Leucocytes per cub. mm. |
|---------------|---------------------------------|---|--|---------------|-------------------------------|
| | Thoma Leitz. | | Haldane | | Thoma Leitz. |
| 27 Sept. 1907 | 1,700,000 | 34 | 35 | 1.030 | — |
| 28 " " | 1,650,000 | 33 | — | — | 25,000 |

Note.—The differential leucocyte count was as follows: S. 10, L. 3, P. 84, E. 2, B. 1, M. 0.

No temperature chart is available in this case.

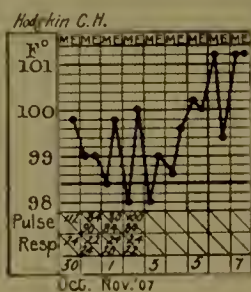
CASE 59.—Ref. No., Vol. 204, No. 402.—Hodgkin H., æt. 46, a dentist, was admitted under the care of Dr. Shaw, October 30th, 1907, and was discharged *in statu quo* on November 7th, 1907. The patient was a widower; he came in for diarrhœa and vomiting. He had suffered from symptoms which he called dyspepsia for four or five years, but he took little or no notice of this until four months before admission. Previous to this he had only suffered from some discomfort after meals, but for the last four months there had been diarrhœa and vomiting, the latter invariably taking place

after meals. He had once or twice noticed a little blood in his motions, and he had had piles. He saw several doctors, and finally came into the hospital, having lost 2 stone in weight in the four months owing to absence of appetite and inability to keep down his food. For some time past he had noticed himself getting out of breath quickly. He was a well-nourished man, apparently of good weight for his size. His complexion was a typical lemon colour. His teeth had been in good order until four months ago, but now they were not so good, and there were very sore and ulcerated places in the inner side of his cheeks where the bad teeth were. The liver dulness extended for 1 inch below the costal margin, but the liver itself could not be felt. The spleen was not felt. The heart was of normal size, and there were no bruits. The lungs were normal. The urine had a specific gravity of 1020; it was alkaline and highly coloured. The temperature was typical. The pulse rate varied between 82 and 108, and the respiration rate between 22 and 26. Diarrhœa was very troublesome, motions being passed as often as ten times in twenty-four hours. The blood count was as follows:—

| Date. | Red corpuscles, per cub. mm. | Red corpus- cles, per cent. of normal. | Hæmoglobin, per cent. of normal. | Colour index. | Leucocytes per cub. mm. |
|---------------|---------------------------------|--|--|---------------|-------------------------------|
| 13 Oct., 1907 | 2,850,000 | 57 | 60 | 1·053 | 1,800 |

Note.—On November 7th the differential leucocyte count was as follows:—S. 54, L. 8, P. 31, E. 0, B. 7. The patient was discharged at his own request with his condition unaltered. Owing to the diarrhœa it was impossible to give arsenical treatment.

The temperature chart was as follows:—



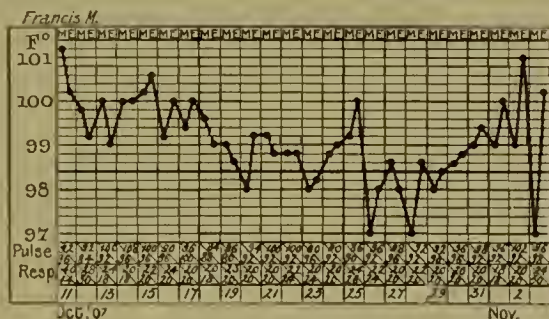
CASE 60.—Ref. No., Vol. 204, No. 352.—Frances M., æt. 52, a married woman, was admitted under Dr. Shaw on October 11th, 1907, and discharged *in statu quo* on November 4th, 1907. She died at home on December 4th, 1907. She came in for shortness of breath. She was the mother of four children, and had had no illnesses at all until the present trouble began two years ago, when she noticed her feet swelling, and found herself short of breath on ordinary exertion. She could attribute this to no cause. She kept on with her work until ten months ago, when she first saw a doctor, and she had been in bed almost all the time since. It was about two months ago that she noticed her colour changing. For the last ten months the patient had had occasional vomiting, once or twice a week, and she had also been much troubled with throbbing in the head, and pain in the region of her ears,

and sleeplessness, for which she had been taking draughts. Two years ago, just before she knew she was so ill, she had had all her teeth removed and a false set made, on account of "dyspepsia." She had lost weight during the last two months. There has been no loss of blood. She had a typical lemon-yellow skin. There was slight pyrexia. There was some slight œdema of the chest and loins, but not of the legs. The heart exhibited well-marked universal hæmic systolic bruits. There were a few râles at both bases, and there was deficient vascular murmur at the apex of the left lung, while at the base of the left lung there was marked dullness and deficiency of vesicular murmur as high as the eighth rib. The liver could be felt three inches below the costal margin. The spleen was not felt. The urine was cloudy, acid, and had a specific gravity of 1011; it contained no albumin or blood, but gave a definite urobilin band spectroscopically. The bowels were open rather too freely. There were no retinal hæmorrhages. Treatment was at first by liquor arsenicalis, but diarrhœa became so troublesome that it had to be stopped, and catechu, kino and opium given instead. The blood counts were as follows:—

| Date. | Red corpuscles, per cub. mm. | Red corpus- cles, per cent. of normal. | Hæmoglobin, per cent. of normal. | Colour index. | Leucocytes, per cub. mm. |
|------------------|---------------------------------|--|--|---------------|--------------------------------|
| 15 October, 1907 | 1,000,000 | 20 | 30 | 1.500 | — |
| 18 " " | 917,900 | 18 | 25 | 1.388 | 4,400 |

Note.—26th October.—The differential leucocyte count was as follows:—S. 65, L. 9, B. 24, E. 2. Films showed many microcytes, megalocytes and poikilocytes. Nucleated red corpuscles were present to the extent of 259 per cub. mm.

The temperature chart was as follows:—



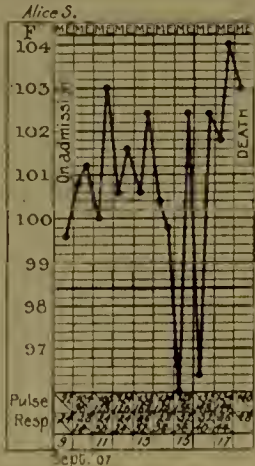
CASE 61.—Ref. No., Vol. 207, No. 423; Post-mortem No. 436, 1907.—Alice S., æt. 35, was admitted under the care of Sir Cooper Perry, on October 9th, 1907, dying upon October 18th, 1907. She was admitted for shortness of breath and general malaise. She had married at twenty-one, and had had four children, the youngest of whom was now four years old; there had been no miscarriage. The patient had been accustomed to work hard in the fields, sometimes as much as ten hours a day, and she did not remember having had any illness except the present one. For the past two or three months she had not felt in her usual state of health, although she could not say that she felt ill. A month ago she felt so weak that she was unable to do her work. She vomited after food, and her skin changed from a rosy colour to a lemon yellow. Headaches were a very troublesome

symptom. There was never any swelling of the feet, and she said she had not wasted at all. She finally called her doctor in, and he diagnosed that her trouble was due to her teeth. There had been trouble with the latter during the last two years, during which time several had been extracted, and there had been an alveolar abscess. She was of the typical colour. The temperature chart was even more marked than in most pernicious anæmia cases, corresponding with the serious condition of her health. The heart was of natural size, and no bruits were heard. The lungs were natural. The teeth, as mentioned, were in an extremely bad septic state, with many stumps. The spleen was not palpable. The liver could just be felt below the ribs. The nervous reflexes were natural. The urine was of an amber colour, slightly cloudy, acid in reaction, and it had a specific gravity of 1022. No albumin was present. Several teeth were removed on October 11th, when a quantity of blood was lost, and it seemed as though the downhill course was accelerated by the teeth extraction. Shortly before death many subcutaneous hæmorrhages appeared. She lapsed into a semi-comatose condition, and died quietly. Treatment had been by means of stimulants and mouth washes, liquor arsenicalis, and saline infusions per rectum. The post-mortem report states that the subcutaneous fat was very yellow; that there were sub-epidermal hæmorrhages and also petechiæ under the pericardium and under the endocardium. The bone marrow of the femur was deep red. The heart was dilated on the right side, and the myocardium exhibited well-marked tabby-cat striation, particularly in the musculi papillares. The kidneys, spleen and liver all gave a good Prussian blue reaction for iron. The kidneys were marked with a few scars, apparently the result of former infarcts. The spleen was enlarged, and the liver had a typical pale chocolate colour. The blood counts were as follows :—

| Date. | Red corpuscles per cub. mm. | Red corpuscles per cent. of normal. | Hæmoglobin, per cent. of normal. | Colour index. | Leucocytes, per cub. mm. |
|------------------|-----------------------------|-------------------------------------|----------------------------------|---------------|--------------------------|
| 10 October, 1907 | 1,800,000 | 36 | 36 | 1.000 | 6,000 |

Note.—Films showed nucleated red corpuscles, and many poikilocytes and megalocytes.

The temperature chart was as follows :—

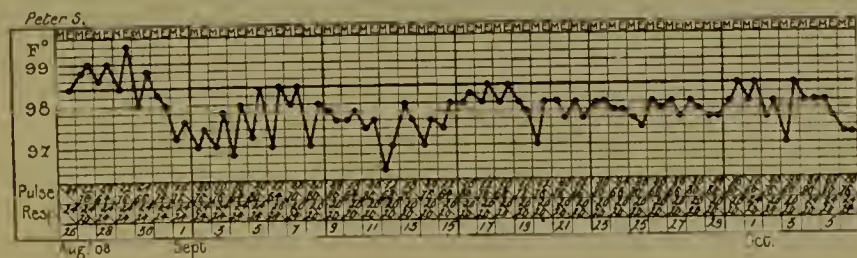


CASE 62.—Ref. No., Vol. 210, No. 365.—Peter S., æt. 42, a baker, was admitted under the care of Dr. Hale White on August 26th, 1908, and discharged relieved on October 13th, 1908. He had worked hard as a baker, and was of very temperate habits. He had been in Stephen Ward under the care of Dr. Pitt eleven years ago, at which time he remained in the hospital seven weeks, and his disease was diagnosed as dyspepsia, part of the treatment consisting in the removal of a number of teeth. Since that time he had been quite well until six months before his admission, when he had an attack of diarrhœa, and at the same time passed blood per rectum. This is the only time that he had done so. He had never vomited, his bowels had been regular, and he was never troubled with flatulence. Since his present trouble started his appetite had been very poor, and he had lost weight considerably. From the time of the diarrhœa, six months ago, until the present time his illness had come upon him progressively, but slowly. He was now very anæmic and feeble, even the slightest exertion being a trouble to him, and he was short of breath unless he lay still. The heart was of normal size, and exhibited no bruits; the lungs seemed natural. The liver could be felt two inches below the costal margin; it was smooth. The spleen could not be felt. The urine was acid in reaction, and was a pale straw colour; had a specific gravity of 1013, and contained no albumin and no indican. The nervous reflexes were natural. He complained of weakness in every joint and of "deadness" in the region of the joints. Treatment was by liquor arsenicalis, which was increased up to 11 minims three times a day. On discharge the man felt comparatively strong and well, but the skin still retained its lemon tint. There was no pyrexia at all in this case, except during the first five days, when the temperature reached 99 or 99·4 in the evening. The pulse rate averaged 64 to 80, the respiration rate 20 to 24. The blood counts were as follows:—

| Date. | Red corpuscles, per cub. mm. | Red corpus- cles, per cent. of normal. | Hæmoglobin, per cent. of normal. | Colour index. | Leucocytes, per cub. mm. |
|---------------|---------------------------------|--|--|---------------|--------------------------------|
| 28 Aug., 1908 | 2,500,000 | 50 | 50 | 1·000 | 5,000 |
| 4 Sept. " | 2,800,000 | 56 | 70 | 1·250 | — |
| 5 " " | 2,800,000 | 56 | 75 | 1·340 | — |
| 7 " " | 2,900,000 | 58 | 75 | 1·293 | — |

Note.—On examination the films showed microcytes and megalocytes; a number of megaloblasts were also seen. The urine contained urobilin.

The temperature chart was as follows:—

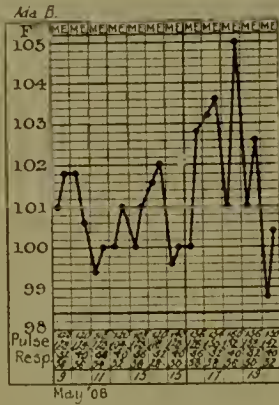


CASE 63.—Ref. No., Vol. 210. No. 238; Post-mortem No. 265, 1908.—Ada B., 37, was admitted under Dr. Hale White on May 9th, 1908, and died May 20th, 1908. She came in for vomiting and for general weakness. She had lived the greater part of her life in a healthy country district, but she had never been a very robust woman. She had been a general servant until she was married at 24, at which time she had her first attack of vomiting and weakness, and her doctor then told her that she had an ulcerated stomach. She had not to her knowledge passed blood per rectum or by mouth. From that time, which was thirteen years ago, except for not being very strong, she had remained fairly well until October, 1907, when "the symptoms of her old complaint," as she said, returned. She became tired, lost her appetite, and if she did take any solid food it was vomited up again shortly afterwards. Even when only taking milk, she vomited; and often blood would come up. The vomiting was always shortly after food, and it was accompanied by pain in the upper part of the abdomen. The symptoms had gradually got worse, until six weeks ago she had been obliged to call her doctor in, and he diagnosed gastric ulcer and treated her for this as before. This relieved her vomiting, but not her general condition, so she was sent to the hospital and admitted. She was a typical lemon-yellow colour. There was marked evening pyrexia. The heart was not enlarged, and there was no bruit, unless a doubtful systolic bruit in the pulmonary area. The lungs were normal. The liver could be felt three-quarters of an inch below the costal margin. The spleen was easily palpable and very firm. There were no abnormal gastric signs. The nervous reflexes were natural. The ophthalmoscope showed numerous small retinal hæmorrhages. Arsenical treatment was adopted. Shortness of breath was very marked, and there was precordial pain, which ultimately turned out to be due to pericarditis, of which she died. The post-mortem examination showed that all the organs were pale and the fat was a bright yellow colour. The thyroid gland presented adenomatous enlargement. The lungs were pale, but otherwise quite normal except for some compression by pericarditis. The heart weighed 356 grams, and it was big and dilated; there was typical pericarditis with many small hæmorrhages, both in the pericardium and also under the endocardium, and also tabby-cat striation, but no valvular lesion. The spleen weighed 500 grams, and contained three infarets. The kidneys were pale and exhibited several small infarets. The liver was large, and both the liver and spleen gave a good Prussian blue reaction. The bone marrow of the femur was a deep red colour. The brain showed no abnormality beyond a few submeningeal petechiæ. The blood count was as follows:—

| Date. | Red corpuscles, per cub. mm. | Red corpus- cles, per cent. of normal. | Hæmoglobin, per cent. of normal. | Colour index. | Leucocytes, per cub. mm. |
|----------------|---------------------------------|--|--|---------------|--------------------------------|
| 10th May, 1908 | 950,000 | 19 | 30 | 1.583 | — |

Note.—No very marked degree of poikilocytosis.

The temperature chart was as follows :—



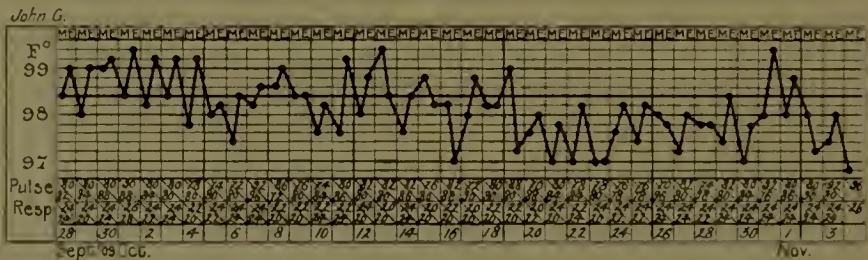
CASE 64.—Ref. No., Vol. 211, No. 367.—John G., æt. 40, a shunter on the railway, was admitted under Dr. Pitt upon September 15th, 1908, and was discharged relieved on November 4th, 1908. He was a married man with a wife and four children. He was born at Redhill, Surrey, and entered the Army in 1888, and up to that time had never been ill. He volunteered for service in India in 1889, and served there for five years. Whilst in India he had an attack of ague. He was seven months in Egypt, and was again troubled with attacks of ague. He returned home in 1895, and in 1899 went out to Africa, serving in Swaziland. Whilst there he was laid up for three months with a very severe attack of malaria. He attributes his illness to the dirty water they had to drink, which he says "was as thick as coffee." He returned to England in 1900, and began work on the South-Eastern Railway. He admits having had gonorrhœa in 1893, but denies any history of syphilis. He traces his present complaint from his attack of malaria in 1900. He was invalided home, but recovered sufficiently to take up work as a shunter. Three years before his admission to Guy's Hospital he was seized with "an attack of the shivers," and could not keep warm. His skin went very yellow about this time, and he attended as an out-patient at Guy's Hospital, and was relieved after having been sent to a convalescent home at Seaford. After the lapse of a few months, however, his illness recurred several times. The present bout of illness began five weeks before his admission, commencing with attacks of shivering as before, together with diarrhœa and extreme weakness. He noticed that his feet and calves were much swollen, and he could not work; he came to the hospital and was admitted. The skin was a decided lemon-yellow colour, but the sclerotics were white. The teeth were in a decayed state, but the mouth otherwise was clean. The liver was felt half an inch below the costal margin, but the spleen was not felt. The lungs were natural. The heart exhibited well-marked signs of aortic regurgitation. The urine had a specific gravity of 1015, was acid and a reddish yellow colour. Dr. Pitt diagnosed pernicious anæmia and aortic incompetence. Treatment was by liquor arsenicalis, which was increased up to eight minim doses three times a day. The general improvement in the appearance of the patient and his general feeling of increased strength were much greater than is indicated by the blood counts. The temperature chart was a typical one, reaching to upwards of 101° F. each evening for the first few days, then to

between 99° F. and 100° F., and finally remaining normal when improvement had set in. Only the latter part of the chart is given below. The pulse rate varied from 72 to 104, and the respiration rate was about 24. The blood counts were as follows:—

| Date. | Red corpuscles, per cub. mm. | Red corpus- cles, per cent. of normal. | Hæmoglobin, per cent. of normal. | Colour index. | Leucocytes, per cub. mm. |
|----------------|---------------------------------|--|--|---------------|--------------------------------|
| | Thoma-Leitz. | | Haldane. | | |
| 20 Sept., 1908 | 687,000 | 14 | 17 | 1·214 | — |
| 7 Oct., " | 1,650,000 | 33 | 37 | 1·121 | — |
| 15 " " | 1,258,000 | 25 | 32 | 1·280 | — |
| 26 " " | 1,500,000 | 30 | 34 | 1·133 | — |

Note.—Blood films showed poikilocytes, many megalocytes, some nucleated red corpuscles and polychromatophilia.

The temperature chart was as follows:—



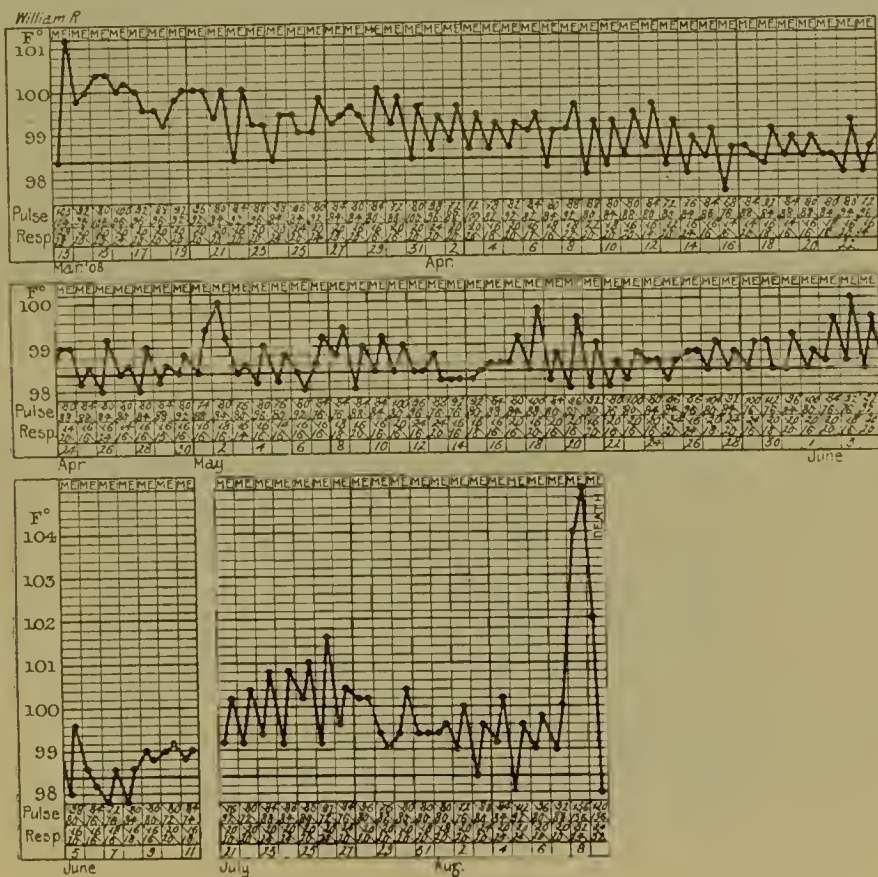
CASE 65.—Ref. Nos., Vol. 213, No. 129; Vol. 214, No. 418; Post-mortem No. 401, 1908.—William R., æt. 45, an upholsterer, was admitted under Dr. Hertz on March 13th, 1908, being discharged relieved, and able to work, on June 12. to relapse and be readmitted under Dr. Faweett on July 21st, 1908, dying on August 19th, 1908. He had been in very good health up to the beginning of his present illness. He had been married twelve years. His trade had always been upholstery, he had always been in good circumstances, and he had not been abroad. About 18 months before his first admission he began to notice that he was more short of breath than usual. He had been gradually getting worse up to the present time. About 12 months ago his eyesight began to fail. His doctor could find nothing wrong with his eyes, and glasses had no effect. It was thought to be tobacco amblyopia which had improved considerably during the last few months. He had to give up his work at Christmas, 1907. For the last few months he had noticed that his hands and feet seemed to be numbed. For a few days previous to his second admission his feet had been swelling. Treatment was by arsenic. He had an extremely pale yellow skin, and it was pigmented in specks and spots. There was some slight œdema of the abdomen and front of the sternum, and a slight lumbar cushion. There was also slight œdema of the ankles continuing as far as the knees. The lips and gums were very pale, the mouth and teeth were clean, though many of the latter were carious. The lungs exhibited signs of œdema at both bases. The respiration rate averaged about 24, until shortly before death, when it rose to 36. The pulse rate varied from about 72 to 96, and shortly before death rose to 156. The temperature chart was typical, evening pyrexia becoming less as the man improved during his first stay in hospital, but returning during the relapse, whilst just before death it rose to 105° F. The heart was of normal size; sometimes it exhibited hæmic bruits, at other times it did not. The spleen came just below the costal margin, and the liver three-quarters of an inch below. The numbness in the hands and knees diminished. The nervous reflexes seemed natural. Shortly after hyper-

pyrexia had set in. the patient became comatose with a subnormal temperature, and died from respiratory failure. The post-mortem examination showed œdema of lungs, and recent acute pericarditis without free fluid, and tabby-cat striation of the heart muscle. The liver exhibited the typical Prussian blue reaction. The bone marrow of the femur was like red currant jelly in colour and consistency, and microscopically it showed numerous nucleated red cells in every stage of formation. The blood counts were as follows :—

| Date. | Red corpuscles per cub. mm. | Red corpuscles per cent. of normal | Hæmoglobin, per cent. of normal. | Colour index. | Leucocytes per cub. mm. |
|----------------|-----------------------------|------------------------------------|----------------------------------|---------------|-------------------------|
| | Thoma Leitz. | | Haldane. | | Thoma Leitz. |
| 14 March, 1908 | 750,000 | 15 | 20 | 1.333 | 3,125 |
| 2 April, " | 1,350,000 | 27 | 45 | 1.666 | 4,000 |
| 28 " " | 2,440,000 | 49 | 72 | 1.469 | 5,160 |
| 8 July, " | 1,400,000 | 28 | 21 | 0.750 | — |
| 4 August, " | 1,400,000 | 28 | 40 | 1.428 | 3,600 |
| 9 " " | — | — | — | — | 20,000 |

Note.—The differential leucocyte count was as follows:—S. 62, L. 1, P. 37, E. 0. In films, both on April 2nd, and on July 8th, there was marked poikilocytosis, and polycromatosis. Megalocytes were abundant. There were also numerous megaloblasts, some with lobulated nuclei, and a few normoblasts. Basophilia of the red cells was very marked.

The temperature chart was as follows :—



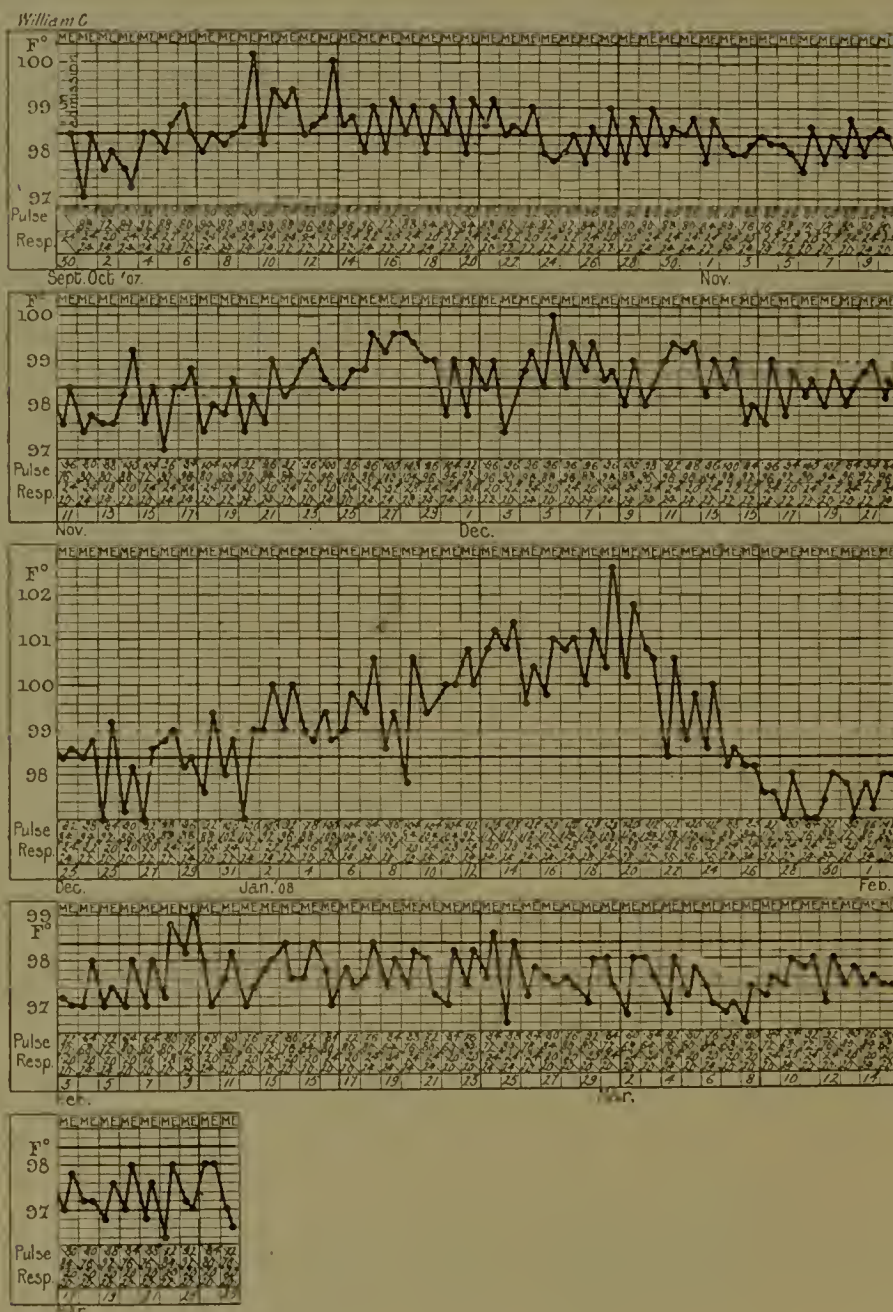
CASE 67.—Ref. No., Vol. 213. No. 19.—William C., æt. 34, a coal porter, was admitted for abdominal pains and anæmia under Dr. Shaw on September 30th, 1907, and was discharged relieved upon March 25th, 1908. Up to a year before his admission the only illness he had had was influenza, nine years before. He had been married for eight years and had three healthy children. He had lived at Gravesend all his life. His bowels were regular, and although he had never had a great appetite, he had had no gastric symptoms. The present illness began a year ago, when he felt generally unwell, and then began to lose his good colour and get short of breath. In December, 1906, he had to give up his work. Then he had pains in his abdomen, head and arms, and was short of breath. He stayed in bed under medical treatment for three months. Feeling a little better after this, he went to Eastbourne to a convalescent home for three weeks, and this made him much better. He went back to work on May 14th, 1907. Three weeks before admission he had a similar attack again with pains in his abdomen, head and arms. There was no bleeding anywhere. He simply became progressively weaker and anæmic. He was a fairly well-built man, by no means thin. The skin was the typical lemon-yellow colour, the sclerotics nearly white. The heart was perhaps slightly dilated, and there were hæmic systolic bruits in all areas. The lungs were natural. The spleen could be felt two inches below the costal margin. The liver could not be felt. The teeth were discoloured, many were carious, and there was much pyorrhœa alveolaris, though the mouth was otherwise clean. The ordinary nervous reflexes were natural. The urine had a specific gravity of 1020, was acid in reaction, contained no albumin, pus or sugar, but enough urobilin to be easily detected by the spectroscope. Arsenical treatment was adopted, but the condition of the abdomen made it difficult to continue with; nevertheless, there were times when he was able to take up to seven minims three times a day. No retinal hæmorrhages were present. In the course of treatment numerous pigmented spots developed on various parts of the body and limbs. The temperature chart showed various degrees of pyrexia. As improvement set in, temperature became normal, the pulse rate 70, respiration about 20.

The blood counts were as follows :—

| Date. | Red corpuscles per cub. mm. | Red corpus- cles, per cent. of normal. | Hæmoglobin, per cent. of normal. | Colour index. | Leucocytes, per cub. mm. |
|-----------------|--------------------------------|--|--|---------------|--------------------------------|
| 4 Oct., 1907 | 1,800,000 | 36 | 49 | 1.361 | — |
| 21 Nov., " | 1,000,000 | 20 | 45 | 2.250 | 4,000 |
| 28 " " | 1,500,000 | 30 | 37 | 1.233 | 3,750 |
| 4 Dec., " | 1,480,000 | 29 | 35 | 1.207 | 2,400 |
| 11 " " | 1,835,000 | 31 | 34 | 1.097 | — |
| 18 " " | 1,895,000 | 38 | 34 | 0.894 | 6,400 |
| 8 January, 1908 | 1,440,000 | 29 | 30 | 1.034 | 3,600 |
| 6 February, " | 2,800,000 | 56 | 60 | 1.071 | — |

Note.—On October 4th, 1907, the differential leucocyte count was as follows:—S. 43, L. 1, P. 46, E. 3, B. 0. In stained films countless poikilocytes and many megalocytes were seen.

The temperature chart was as follows :—



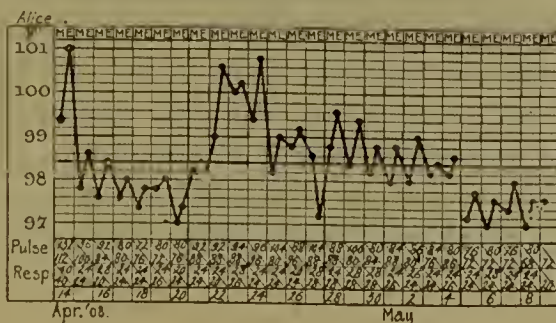
CASE 68.—Ref. No., Vol. 214, No. 237.—Alice I., æt. 28, a bar help, was admitted under the care of Dr. Hertz on April 14th, 1908, and was discharged relieved on May 9th, 1908. She has not been traced since. She gave the history that at 11 years of age she had had St. Vitus' dance, for which she was in Charing Cross Hospital; at 23 years of age she had had acute rheumatism, for which she was in St. George's Hospital; at Christmas, 1904, she had what she was told was congestion of the liver, for which she was in Waterloo Hospital. She says she had a severe pain over the liver for which leeches were put on. When she was in the hospital she was told

that her liver and spleen were enlarged, and she was particularly asked if she drank much; at Christmas, 1906, she again went to Waterloo Hospital complaining of dizziness, constipation, of a yellow-coloured skin, and of dark spots in front of her eyes. She was an in-patient. Pernicious anæmia was diagnosed, and she was relieved by the treatment she received. At Christmas, 1907, she was again in Waterloo Hospital for eight days, with the same symptoms, plus sickness. On the day after leaving Waterloo Hospital she went to St. Thomas's, where she remained five weeks. She was given medicine, which was probably arsenic, as it gave her diarrhœa, and made her eyes water. She was much relieved again. She left the hospital in February, 1908, and remained fairly well until the beginning of April, 1908, when she became ill again, and felt she was getting weaker and weaker every day. As before, she complained greatly of black spots before her eyes, severe headaches, and pain over her heart. Six days before admission she first noticed blood in her motions. She had never passed blood before, but she had suffered from "piles" for some time. She was a typical light-yellow colour, with a tendency to cyanosis. Her heart was of normal size with a suspicion of a local systolic bruit at the impulse, but no evidence of valvular disease. The lungs were natural. Great thirst was complained of, but the condition of the mouth was good, except for a furred tongue, but several teeth were decayed, and these were subsequently extracted under gas. The knee-jerks were unduly brisk, but otherwise the nervous system seemed natural. The urine had a specific gravity of 1015; it was alkaline, of a deep reddish colour, and contained no albumin or sugar, blood, urobilin, or indican. Analyses of the gastric juice showed absence of hydrochloric acid. The liver came down to the level of the umbilicus, and the spleen to one inch below that. The temperature was raised in the evening at first; as improvement set in it remained normal. The pulse rate varied from 70 to 100, and the respiration rate from 20 to 28. The patient was treated with cinnamon oil and liquor arsenicalis. She improved considerably in her general condition before she was discharged, though the blood counts do not indicate this clearly:—

| Date. | Red corpuscles per cub. mm. | Red corpus- cles, per cent. of normal. | Hæmoglobin, per cent. of normal. | Colour index. | Leucocytes, per cub. mm. |
|----------------|--------------------------------|--|--|---------------|--------------------------------|
| | Thoma Leitz. | | Haldane. | | Thoma Leitz. |
| 14 April, 1908 | 1,200,000 | 24 | 26 | 1.083 | 7,500 |
| 20 " " | 1,875,000 | 38 | 50 | 1.316 | — |

Note.—April 14th, 1908: In stained films many poikilocytes, megalocytes, microcytes, and three nucleated red cells were seen.

The temperature chart was as follows:—



SUMMARY.

The following is a summary of the chief features of the above sixty-eight cases, as distinct from the "conclusions" on page 119:—

CHARACTERS OF THE URINE.

The urine in pernicious anæmia presents the very greatest variability both in colour, specific gravity, and constituents.

Blood.—It is noteworthy that blood was not recorded in a single specimen of urine in all the sixty-eight cases.

Albumin.—Albumin is seldom present in any large amount. It was found in eleven cases (Nos. 4, 7, 8, 11, 17, 24, 28, 33, 36, 37, 58), but seldom in more than a trace, and often only upon a single occasion.

Indican.—This is specifically mentioned as being present in excess in six cases (Nos. 7, 8, 10, 13, 23, 34), and as absent in four cases (Nos. 33, 48, 62, 68), whilst it is not mentioned at all in the remainder.

Urobilin.—This will be found at one time or another in almost every case of pernicious anæmia if it is tested for at intervals; if, however, it is looked for only on a single occasion, it is often recorded as absent. The test applied has been the ordinary spectroscopic one without any elaborate extractions. Making allowance for this, it is recorded as being found in twenty-three cases (Nos. 1, 7, 8, 9, 10, 13, 15, 16, 19, 21, 23, 25, 28, 29, 38, 43, 49, 52, 53, 57, 60, 62, 67), as not being found in twelve cases (Nos. 3, 11, 20, 22, 30, 33, 34, 35, 39, 45, 48, 68), whereas in the remaining thirty-three cases it is not mentioned at all.

Bile pigment.—Bile pigment was not obviously present in any case.

Sugar.—Glycosuria did not occur in any case.

Uric acid.—Spontaneous deposition of uric acid crystals, as a "cayenne pepper" precipitate that was obvious to the naked eye, occurred in four cases (Nos. 9, 11, 30, 37).

Reaction.—The reaction is nearly always acid to litmus paper; only in one case (No. 68) was it recorded as alkaline.

Tyrosine.—Seeing that the liver functions are very much altered from the normal in pernicious anæmia, it is not very surprising that, just as in acute yellow atrophy of the liver, leucin and tyrosine should sometimes escape being converted into urea and appear unaltered in the urine. In most cases it would probably be necessary to evaporate and extract the urine in order to detect the small amounts of tyrosine present, but occasionally the typical sheaves of crystals appear spontaneously in the deposit, as in case 52.

Colour.—The colour of the urine varies enormously in pernicious anæmia, both in different cases and in the same case at different times. The following notes are from successive cases about the time of their admission to hospital:—High coloured, pale sherry coloured, dark, light red colour, dark, constantly pale, dark, light coloured, high coloured, very pale, deep red-brown, pale amber, dark amber, abnormally dark, straw coloured, pale yellow, dark reddish, orange, dark, dark orange, dark brandy colour, pale yellow, dark, high coloured, amber yellow, pale, straw coloured, high coloured, pale and cloudy, amber, pale straw colour, reddish yellow, deep reddish. It is noteworthy that urobilin may be present even when the urine is pale, or at any rate not dark (*e.g.*, case 62).

Specific gravity.—As regards the specific gravity, the variations are equally great, yet well within the normal limits, as shown by the following figures from successive cases at or about the time of their admission to hospital:—1014, 1030, 1012, 1010, 1020, 1014, 1020, 1020, 1008, 1018, 1008, 1020, 1008, 1012, 1010, 1020, 1014, 1012, 1010, 1020, 1012, 1020, 1015, 1032, 1020, 1016, 1010, 1016, 1012, 1014, 1018, 1026, 1015, 1015, 1016, 1012, 1020, 1009, 1016, 1008, 1020, 1011, 1022, 1013, 1015, 1020, 1015.

ŒDEMA.

It is possible for extensive œdema to occur in pernicious anæmia, as in cases 3, 11, 30, 33, 35, 43, 51 and 65, where it involved not only the legs, but also the back and abdominal wall. It is much more common, however, for there to be no more than slight swelling of the feet and ankles when the patient is up and about, disappearing when he rests in bed, as in cases 2, 4, 6, 16,

18, 20, 23, 25, 28, 31, 36, 44, 46, 47, 53, 55, 57, 60, 64, or for there to be none at all, as in the remaining cases, some of which exhibited no œdema at all from start to finish.

SEROUS EFFUSIONS.

In some of the blood diseases it is common to find serous or inflammatory exudation into one or more of the serous cavities, either when the end is near, or earlier. It is often taught that this is true of pernicious anæmia also, but to judge from the sixty-eight cases under discussion serous exudation or inflammations of serous membranes are the exception. In fifty-six cases the serous membranes were unaffected, although in many of these the patient was followed to the post-mortem room. Only in the following were they affected :—

In case 6 there was ascites from "simple" peritonitis.

" 10 there was acute terminal pericarditis.

" 26 there was acute terminal pneumonia and pleurisy.

" 28 there was a serous exudate of 1,200 c.c. in the right pleural cavity; the left pleura was universally adherent.

" 29 there was acute terminal pneumonia and pleurisy.

" 35 there was ascites some time before death, the abdomen being incised and drained.

" 43 there was acute pleurisy a little while before the end.

" 53 there was pleurisy with effusion, requiring tapping twice.

" 58 there was acute terminal pneumonia, pleurisy, pericarditis, and acute capsulitis of the spleen.

" 63 there was acute terminal pericarditis.

" 65 there was acute terminal pericarditis.

" 66 there was acute terminal pleurisy.

Apart from quite terminal pneumonia, pleurisy or pericarditis, therefore, there were only four cases in which the term serous effusion could be used in its ordinary sense.

THE SIZE OF THE SPLEEN.

See pages 105 and 106.

THE SIZE OF THE LIVER.

It is scarcely surprising that the liver should be enlarged in a disease in which the blood destruction appears to play so prominent a part. Clinically the liver was not felt in thirty-six cases (Nos. 2, 4, 5, 9, 12, 13, 15, 16, 18, 19, 20, 21, 23, 26, 27, 28, 29, 32, 35, 36, 39, 40, 41, 42, 43, 45, 46, 47, 48, 50, 51, 54, 55, 57, 66, 67); it was "just palpable" in ten cases (Nos. 7, 8, 17, 24,

31, 44, 52, 56, 61, 64). It came about one inch below the ribs in twelve cases (Nos. 1, 3, 10, 14, 25, 33, 34, 37, 53, 59, 63, 65); two inches below the ribs in three cases (Nos. 22, 30, 62); three inches below the ribs in three cases (Nos. 6, 58, 60); four inches below the ribs in two cases (No. 11, 68). No mention of it is made in the remaining two cases. In confirmation of the clinical fact that the liver is so often palpable the weight of the organ post-mortem is more than normal in over half the cases. Thus :—

| | | | | Grams. | | | | | Grams. |
|------------------|-----|-----|--|--------|-------------------|-----|-----|--|--------|
| In case 4 it was | ... | | | 1824 | In case 30 it was | ... | | | 1312 |
| " 11 | " | ... | | 2560 | " 32 | " | ... | | 826* |
| " 17 | " | ... | | 1632 | " 33 | " | ... | | 1390 |
| " 22 | " | ... | | 2048 | " 35 | " | ... | | 1128 |
| " 25 | " | ... | | 1521 | " 51 | " | ... | | 1848 |
| " 26 | " | ... | | 2030 | " 66 | " | ... | | 1892 |
| " 28 | " | ... | | 1512 | * A child of 10. | | | | |

THE PRUSSIAN BLUE REACTION.

In every case in which a post-mortem examination was made (cases 4, 10, 11, 13, 17, 22, 24, 25, 26, 23, 29, 30, 32, 33, 35, 37, 39, 40, 43, 48, 51, 53, 58, 61, 63, 65, 66), the Prussian blue reaction was well marked in the liver, and in nearly every case the viscus had the typical café-au-lait colour. As regards the corresponding reactions in the spleen and kidneys, they were noted as follows :—

| Prussian blue iron reaction in the spleen. | | Prussian blue iron reaction in the kidneys. | |
|--|---------------------------|---|--|
| Case 10. | Slight Fe reaction. | Case 10. | Marked Fe reaction. |
| 11. | Good Fe reaction. | 11. | Marked Fe reaction. |
| 17. | Considerable Fe reaction. | 17. | Considerable Fe reaction. |
| 25. | No Fe reaction. | 26. | No Fe reaction. |
| 37. | Fair Fe reaction. | 29. | Some degree of Fe reaction. |
| 39. | No Fe reaction. | 32. | Considerable Fe reaction. |
| 51. | Marked Fe reaction. | 35. | Nearly as marked Fe reaction. |
| 53. | Some Fe reaction. | 39. | No Fe reaction, as of liver. |
| 61. | Good Fe reaction. | 48. | Quite as marked reaction, as in the liver. |
| 63. | Good Fe reaction. | 51. | Well-marked Fe reaction. |
| | | 53. | Slight Fe reaction. |
| | | 61. | Good Fe reaction. |

ANALYSES FOR IRON.

In cases 33 and 35, analyses of the iron in certain of the viscera were made by Dr. J. H. Ryffel, who, in order to avoid the great

difficulties there are in washing the viscera clear of blood, analysed organs from another case, not pernicious anæmia, at the same time by precisely similar methods for purposes of comparison It was found that:—

The control liver yielded 0·14 per cent. of Fe in the dried residue.

The pernicious anæmia liver (case 33) yielded 0·34 per cent. of Fe in the dried residue.

The pernicious anæmia liver (case 35) yielded 1·015 per cent. of Fe in the dried residue.

The pernicious anæmia kidney (case 35) yielded 0·512 per cent. of Fe in the dried residue.

The pernicious anæmia spleen (case 35) yielded 0·335 per cent. of Fe in the dried residue.

THE KIDNEY WEIGHTS IN PERNICIOUS ANÆMIA.

The kidneys are nearly always large and pale, and generally they give a fairly good Prussian blue reaction (see pages 102 and 213). The weights available in the above cases are as follows:—

In case 10 the weight of the two kidneys was 432 grams.

| | | | | |
|---|----|---|---|-----|
| " | 11 | " | " | 416 |
| " | 13 | " | " | 288 |
| " | 17 | " | " | 320 |
| " | 22 | " | " | 304 |
| " | 25 | " | " | 386 |
| " | 26 | " | " | 405 |
| " | 28 | " | " | 351 |
| " | 30 | " | " | 260 |
| " | 35 | " | " | 260 |
| " | 39 | " | " | 392 |
| " | 48 | " | " | 481 |
| " | 58 | " | " | 372 |
| " | 66 | " | " | 342 |

Doubtless part of the increased weight is due to the same cause as that of an ordinary "india-rubber" cardiac kidney, but owing to the anæmia there is pallor and not cyanosis. There were infarcts in cases 25 and 63 only.

THE HEART.

In the great majority of cases the heart is of natural size, with its impulse at or near its normal position; whilst when the anæmia is profound there are hæmic systolic bruits in each precordial area and in the veins of the neck, lessening in intensity and even disappearing if the patient rallies and the anæmia diminishes. Post-mortem the muscle is pallid, with well-marked tabby-cat striation, especially in the musculi

papillares of the left ventricle, whilst the valves are healthy; the pericardium is healthy except that there may or may not be sub-pericardial petechiæ.

The only exceptions to the above rule amongst the sixty-eight cases were the following :—

In case 10 there was terminal pericarditis.

" 11 there was fungating endocarditis.

" 22 the heart was large, weighing 14 oz.

" 26 the heart was large, weighing 444 grams.

" 46 the impulse was 1 in. outside the left nipple line.

" 48 the heart was large, weighing 481 grams.

" 58 the heart was very big, weighing 612 grams, the result of old mitral stenosis and recent aortic endocarditis and pericarditis.

" 63 there was terminal pericarditis.

" 64 there was syphilitic aortic disease with regurgitation.

Bruit de galop.—A canter rhythm is so characteristic a physical sign of pericarditis that one is a little too apt, perhaps, to forget that it can also be produced by a dilated, particularly by a fatty dilated, heart when there is no pericarditis at all. This is well exemplified by cases 4 and 25, in which the bruit de galop was well marked during life, whilst the absence of pericarditis was confirmed by autopsy. It is possible, indeed probable, that the canter rhythm in case 34 was of the same nature, but there was no post-mortem examination to prove it in that case.

THE LUNGS.

It is remarkable how seldom there is anything the matter with the lungs or pleuræ in pernicious anæmia, except agonal œdema; even a terminal pleurisy or pneumonia is distinctly uncommon. Healed phthisis may, of course, be found in these as in any other cases, and pleural adhesions of old date are to be expected. Upon the whole, however, one may say that the lungs were natural in sixty-one out of sixty-eight cases, being abnormal only in the following :—

In case 17 there were rhonehi during life, but the lungs looked healthy post-mortem.

" 26 there was acute terminal pneumonia.

" 28 there was serous effusion with plastic pleurisy.

" 29 there was acute septic pneumonia and pleurisy.

" 53 there was acute pleurisy on both sides.

" 58 there was acute terminal pneumonia and pleurisy.

" 66 there was terminal pleurisy.

GASTRO-INTESTINAL SYMPTOMS.

See page 109.

THE MOUTH.

For the condition of the mouth and teeth see page 112.

HÆMORRHAGES.

There is no mention of any hæmorrhages in cases 5, 6, 15, 18, 19, 20, 21, 28*, 29*, 31, 32*, 35*, 36, 42, 47, 51*, 53*, 55, 56, 58*, 59, 64, 65*, 66*.

There was a specific mention that hæmorrhages were absent in cases 7, 33*, 45, 60, 67.

Retinal hæmorrhages were seen in sixteen cases (Nos. 2, 4*, 9, 10*, 11†*, 13*, 22*, 26†, 30*, 38, 39†*, 41†, 48*, 50, 57†, 63†*). They were looked for and not found in twenty cases (Nos. 1, 3†, 6, 7, 8†, 15*, 17*†, 18*, 20*, 23*†, 27*, 28*, 35*, 45*, 52, 53, 54*†, 60, 65, 67*).

Subcutaneous petechiæ or purpura occurred in twelve cases (Nos. 8, 11†*, 16, 23†, 24*, 25†*, 26†, 39†*, 40†*, 44†, 46*, 61†*.)

Blood was passed per anum, in small or large amounts, in twelve cases (Nos. 3, 11†*, 14†*, 17*, 23†, 34,† 37†*, 43, 44†, 54, 62, 68).

Epistaxis occurred in nine cases (Nos. 11†*, 25†*, 26† (extreme); 27 (severe); 37†*, 40†* (severe); 41†, 52, 57.

Hæmatemesis occurred in four cases (Nos. 34† (very slight); 40,†* 49 (doubtful); 63†*).

Hæmoptysis in three cases (Nos. 1, 12, 52†).

Bleeding gums in two cases (Nos. 26,† 34†).

Severe after tooth extraction in one case (No. 61†*).

Terminal cerebral in one case (No. 14†*).

It is clear that pernicious anæmia may prove fatal without at any time leading to serious hæmorrhage. It is also clear that small hæmorrhages, especially retinal and subcutaneous, are not infrequent in the later stages of the disease; seldom, however, is the amount of hæmorrhage in itself serious, in only four out of sixty-eight cases (Nos. 11, 36, 40, and 61).

* The asterisk signifies that the patient died within a short time.

† The dagger signifies that there were also other hæmorrhages in this case.

It is noteworthy that even when much purpura and many retinal hæmorrhages have occurred, the prognosis, though often very bad, is not necessarily one of immediate fatality, as cases Nos. 38, 44, and 50 prove.

RETINAL CHANGES.

In addition to retinal hæmorrhages (for which see page 216), the following retinal changes were observed :—In case 4, chorioiditis and optic atrophy, possibly syphilitic ; in case 50, exudation around the optic discs ; whilst in case 65, although there was marked amblyopia, possibly due to tobacco rather than to pernicious anæmia, the optic discs looked natural.

SEX.

Of the sixty-eight cases, thirty-one were females and thirty-seven were males.

AGE.

Without distinction as to sex, the minimum age was 10 years ;* the maximum age was 67 years ; and the average age of the whole sixty-eight cases was 45 years.

If we distinguish the ages according to sex, we find :—

| MALES. | | | FEMALES. | | |
|---------|-----|-----------|----------|-----|------------|
| Minimum | ... | 22 years. | Minimum | ... | 10 years.* |
| Maximum | ... | 67 " | Maximum | ... | 55 " |
| Average | ... | 48 " | Average | ... | 43 " |

If we work out the age-incidence by decades, we find that—

| | | |
|---------------|--------------------|------------------|
| | At 10 years of age | there was 1 case |
| Between 10—20 | " | there were 0 |
| 20—30 | " | 3 cases |
| 30—40 | " | 11 |
| 40—50 | " | 28 |
| 50—60 | " | 19 |
| 60—70 | " | 6 |
| 70—80 | " | 0 |

DURATION AFTER DIAGNOSIS.

See page 116.

INTERVAL BETWEEN FIRST SYMPTOMS AND CORRECT DIAGNOSIS.

See page 117.

* Case No. 32, *q.v.* There are points in which this case differs a little from other cases of pernicious anæmia.

RALLIES.

The number of times the patient rallied and improved in health was as follows:—

- Not once in twenty-one cases (Nos. 4, 6, 9, 10, 16, 17, 22, 24, 25, 26, 27, 29, 37, 48, 51, 56, 58, 59, 60, 63, 66).
- Once at least in nineteen cases (Nos. 2, 7, 12, 13, 18, 19, 20, 23, 31, 33, 35, 44, 45, 49, 50, 54, 58, 61, 65).
- Twice at least in sixteen cases (Nos. 3, 5, 11, 14, 21, 28, 30, 34, 38, 39, 41, 42, 47, 53, 62, 67).
- Three times at least in four cases (8, 32, 52, 68).
- Four times at least in one case (No. 57).
- Five times at least in three cases (Nos. 1, 15, 36).
- "Many times" in three cases (Nos. 43, 46, 64).
- Not known in one case (No. 40).

THE PATIENT'S WEIGHT.

It is a point in diagnosis that a pernicious anæmia case may keep up quite a good bulk even to the end. Emaciation, such as occurs in cancer cases, is possible in pernicious anæmia, but exceptional. At the same time there is nearly always loss of weight, sometimes considerable. This loss of weight, without great decrease in bulk, is due to the replacement of some of the heavier tissues by typical bright yellow fat.

The state of the body is not definitely described in twenty of the cases, but in the remainder the following notes were made:—

- Case 2. 140lbs.
- 3. Well covered.
- 5. An averagely plump man. Weight 10½st. without clothes.
- 6. A stout woman.
- 7. General flabby fatness rather than wasting.
- 8. Fairly well nourished and did not complain of loss of weight.
- 10. Loss of weight down to 8st. 9lb., but much less loss of bulk.
- 11. Little loss of bulk; weight 11st. 11lb. without clothes.
- 13. Height 5ft. 5in., weight 8st. without clothes.
- 14. 8st. 9lbs., increasing to 13st. 7lbs.
- 15. Not wasted, but thinner than he had been. Weight 10st. 5lbs. in clothes.
- 16. 9st. 11lbs. without clothes. Very slight loss of bulk.
- 17. Lost flesh slightly.
- 18. 130lbs. Has lost weight, but not bulk.
- 19. Very thin. 5st. 4lbs.
- 21. 7st. 2lbs.
- 22. A stout-looking woman, not wasted.
- 27. Looked well nourished, but said he had lost 2st. in weight.

- Case 28. Somewhat thin. Later wasted from peripheral neuritis.
 30. Had lost much weight.
 31. Had not lost bulk, but weighed only 123lbs.; rose to 132lbs. in a little over two weeks.
 32. Very wasted.
 34. Loss of weight.
 35. Had lost weight, but not bulk.
 36. No obvious wasting, though very ill.
 37. Not emaciated, though very weak.
 38. Lost in weight, but not obviously in bulk.
 39. Very thin.
 40. Complained of loss of weight. Weighed 8st. 13lbs. on admission and 9st. 5lbs. later. Had been 13st.
 41. Well covered with fat all over.
 42. Lost weight, but not bulk.
 43. Not emaciated, but tall and spare.
 44. 9st. 10lbs., rising to 10st. 2lbs.
 45. Decidedly plump.
 46. A well-nourished woman.
 47. 11st. 11lbs. Did not look wasted.
 48. Well nourished, though *in extremis*.
 51. Not at all emaciated (post-mortem).
 52. Well nourished.
 54. Getting thinner, but still fat.
 55. Well covered.
 57. Progressive loss of weight.
 58. Thin and weakly.
 59. Well nourished.
 60. Had lost weight.
 61. Had not wasted at all.
 62. Had lost weight considerably.
 67. Well-built man, by no means thin.

NERVE SYMPTOMS IN PERNICIOUS ANÆMIA.

See page 106.

THROMBOSIS.

In only two cases was thrombosis noted during pernicious anæmia (Nos. 21 and 54). In each case the thrombosis was in the right leg, and in each case it was not a terminal complication, but a relatively early accident.

MENSTRUAL DISORDERS.

In former days there was confusion between the severe anæmias that might result from long-continued loss of blood and true pernicious anæmia. It is worthy of note that in not one of the present sixty-eight cases was there either metrorrhagia or

menorrhagia. In more than one there was amenorrhœa, and in case 21 leucorrhœa was troublesome. Otherwise the pelvic functions were conspicuously natural. Of the thirty-one female patients five were spinsters.

ARTHRITIS.

There are not a few observers who regard a septic condition of the mouth as a potent cause of rheumatoid arthritis. The condition of the mouth in pernicious anæmia cases is sufficiently often septic (see page 113) to make one expect that rheumatoid arthritis should be fairly common in these cases. It is noteworthy, therefore, that only in one case (No. 30) was there definite subacute rheumatoid arthritis, whilst in one other there was "troublesome stiffness of the knee-joints." In the remaining sixty-six cases no joint troubles attracted attention.

RIGORS.

It may be noted that, although there is no mention of any rigors in sixty-four out of the sixty-eight cases, in four these were very definite symptoms, and in three of the four appeared to be directly connected with the disease.

In case 11 the rigors were terminal, and definitely associated with fungating endocarditis; in case 39 "cold shivers" were an early symptom; in case 50 the disease started almost suddenly with "a cold shiver" which made the patient so ill that he had to take to bed at once; whilst in case 64, although the "attack of the shivers" that ushered in the illness three years before his admission might possibly have been malarial, it is noteworthy that each relapse was also associated with a similar attack of the shivers, leading, without perceptible interruption, directly into undoubted pernicious anæmia.

TENDERNESS OF THE LONG BONES.

It is well known that the shafts of the long bones are apt to be very tender in more than one of the blood diseases. Unfortunately the notes upon this point here are very incomplete, the only actual statements available being as follows:—

Case 4. No tenderness of bone.

7. Tenderness along all the long bones.

25. No tenderness of bones.

- Case 31. Long bones decidedly tender.
 34. Tender long bone shafts.
 35. Tender bones.
 44. Bones of legs very tender.
 52. Very tender bones.

THE BONE MARROW OF THE SHAFT OF THE FEMUR.

The tenderness of the long bones is thought to be associated with the changes in the marrow; it seldom happens that the femur marrow in a fatal case of pernicious anæmia is not dark red instead of yellow—"like red-currant jelly," as a rule—as in cases 10, 29, 30, 33, 39, 53, 58, 61, 63, and 65. This redness is, of course, by no means specific, for it occurs in a large number of different conditions in which there is profound anæmia and a severe strain upon the blood-forming organs. It is very constant in pernicious anæmia, and microscopically there is little or none of the usual fat left, its place being occupied by crowds of nucleated red corpuscles in every stage of formation, together with varying numbers of bone-marrow cells and leucocytes.

THE COLOUR INDEX.

The question of the colour index, and of the fact that it is quite often less than one in pernicious anæmia cases, is discussed on page 114. Analysis of the various blood counts, exclusive of cases where only one blood count was made, shows that—

In case 1 out of 27 counts the colour index was not greater than 13 mm.

| | | | | | | | |
|---|----|---|----|---|---|---|----|
| " | 2 | " | 4 | " | " | " | 0 |
| " | 3 | " | 10 | " | " | " | 1 |
| " | 7 | " | 5 | " | " | " | 4 |
| " | 8 | " | 13 | " | " | " | 4 |
| " | 9 | " | 3 | " | " | " | 2 |
| " | 10 | " | 22 | " | " | " | 17 |
| " | 11 | " | 13 | " | " | " | 6 |
| " | 13 | " | 4 | " | " | " | 3 |
| " | 14 | " | 3 | " | " | " | 1 |
| " | 15 | " | 8 | " | " | " | 4 |
| " | 16 | " | 5 | " | " | " | 2 |
| " | 18 | " | 10 | " | " | " | 5 |
| " | 19 | " | 5 | " | " | " | 3 |
| " | 20 | " | 5 | " | " | " | 4 |
| " | 21 | " | 2 | " | " | " | 1 |
| " | 23 | " | 5 | " | " | " | 2 |
| " | 25 | " | 5 | " | " | " | 3 |
| " | 27 | " | 17 | " | " | " | 12 |

In case 28 out of 11 counts the colour index was not greater than 3 mm.

| | | | | | | | |
|---|----|---|----|---|---|---|----|
| " | 30 | " | 10 | " | " | " | 3 |
| " | 31 | " | 2 | " | " | " | 1 |
| " | 33 | " | 15 | " | " | " | 8 |
| " | 34 | " | 12 | " | " | " | 0 |
| " | 35 | " | 8 | " | " | " | 1 |
| " | 36 | " | 6 | " | " | " | 5 |
| " | 37 | " | 3 | " | " | " | 2 |
| " | 38 | " | 7 | " | " | " | 3 |
| " | 39 | " | 6 | " | " | " | 4 |
| " | 41 | " | 5 | " | " | " | 2 |
| " | 42 | " | 3 | " | " | " | 0 |
| " | 43 | " | 21 | " | " | " | 10 |
| " | 44 | " | 5 | " | " | " | 3 |
| " | 45 | " | 5 | " | " | " | 3 |
| " | 46 | " | 3 | " | " | " | 0 |
| " | 47 | " | 7 | " | " | " | 3 |
| " | 48 | " | 3 | " | " | " | 0 |
| " | 49 | " | 3 | " | " | " | 2 |
| " | 50 | " | 2 | " | " | " | 2 |
| " | 51 | " | 4 | " | " | " | 1 |
| " | 52 | " | 14 | " | " | " | 1 |
| " | 53 | " | 12 | " | " | " | 6 |
| " | 54 | " | 3 | " | " | " | 0 |
| " | 55 | " | 4 | " | " | " | 2 |
| " | 56 | " | 7 | " | " | " | 2 |
| " | 57 | " | 19 | " | " | " | 5 |
| " | 60 | " | 2 | " | " | " | 0 |
| " | 62 | " | 4 | " | " | " | 1 |
| " | 64 | " | 4 | " | " | " | 0 |
| " | 65 | " | 5 | " | " | " | 1 |
| " | 67 | " | 8 | " | " | " | 1 |
| " | 68 | " | 2 | " | " | " | 0 |

Out of a total of 391 counts the index was not greater than 1 in 162

THE SKIN.

The colour of the skin was typical lemon-yellow in almost all the cases by the time they were admitted to hospital; but it is most important to bear in mind that this yellowness is by no means the earliest symptom, as a rule. Not a few cases had been definitely ill for months or even for years before the yellowness of the skin attracted attention.

The familiar mistaking of the colour for "jaundice" by the patient's friends is easily to be avoided if the pearly-white colour of the conjunctivæ is noticed. In not one of the sixty-eight cases was there jaundice.

The yellow colour of the skin is very largely due to the skin itself becoming so thin as to transmit the colour of the underlying fat. The bright yellowness of the latter post-mortem in pernicious anæmia is almost characteristic.

The question of purpura is noticed on page 216.

As regards undue pigmentation of the skin, especially the freckle-like form, it was present in twelve cases (Nos. 15, 16, 23, 30, 43, 46, 48, 49, 53, 56, 65, and 67).

Pigmentation in the mouth (cases 43 and 53) is referred to on page 103.

THE MALAR FLUSH.

Attention may be drawn to the very noticeable appearance of some cases of pernicious anæmia, particularly when improvement has been considerable; and that is the persistence of a more or less yellow colour over the greater part of the face, with a warmer red flush over the malar bones and central parts of the cheeks. The colour is decidedly reminiscent of sunburn, and at first sight it suggests extremely good health; needless to say, this appearance is entirely deceptive. I think some cases may be recognised in the earlier stages of the malady before the malar flush has faded into the ultimate lemon yellow. The warmth of malar colour was presented very decidedly by cases 10, 14 and 45; whilst a near approach to it is given by the ward clerk's description of case 33 as "a pale woman with some colour in her cheeks."

